

MACHINERY

NOVEMBER 19, 1958

ONE SHILLING AND THREEPENCE



For a wonderfully smooth drive
... Holroyd worm gears

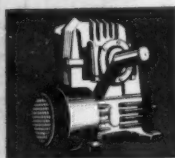
Did you know that all Holroyd worm gears are made in such a manner as to give some allowance for the inevitable deflection of bearings and gear housing? This results in an improvement in performance because the gears are then working correctly in the loaded position. We are able to do this by a technique of manufacture which gives precise control over the tooth marking.

In certain cases we go further than this and make the gears so that they have some latitude in assembly without impairing

the efficiency. This is particularly valuable where the gears are difficult of access for adjustment during assembly.

Another point—Holroyd worm gears are made, if required, right down to 1/1 ratio as an everyday product—we have a special plant for such gears.

And don't forget that Holroyd worm gears around 1/1 or 2/1 ratio will carry several times the load which can be put through a pair of straight faced spiral gears of the same dimensions, and will work with an efficiency of the order of 97 per cent.



Have a word with **Holroyd**

John Holroyd & Co. Ltd. Milnrow, Lancashire.

90 YEARS OF GEARS

Introducing the

ASQUITH

**GIRDER END
FACING MACHINE**

A new machine designed specifically for structural engineers, with adequate power for milling with carbide cutters the ends of girders which often involve interrupted cutting and include welds and welding scale. Write today for full specification.

WILLIAM ASQUITH LTD.
HALIFAX . ENGLAND

Sales & Service for . . .

DRUMMOND-ASQUITH

the British Isles

DRUMMOND-ASQUITH (SALES) LTD., KING EDWARD HOUSE, NEW ST., BIRMINGHAM

'Phone: Midland 3431 (7 lines) Grams: Maxishape, Birmingham. Also at LONDON: 'Phone: Trafalgar 7224 (5 lines) and GLASGOW: 'Phone Central 0922

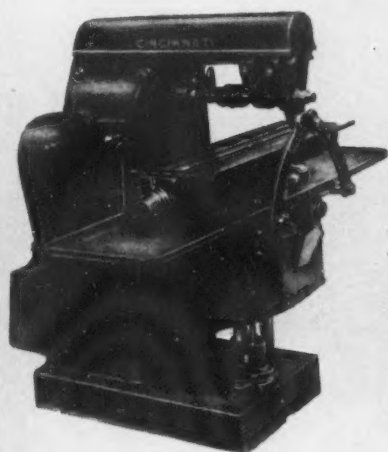
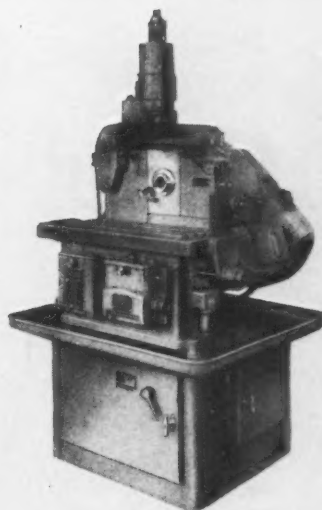
PRODUCTION MILLERS

....Automatically

CINCINNATI

The 0-8 Plain Automatic Milling Machine—built by our Associates in Holland—is a milling machine capable of the highest rates of production. Available with power Rise and Fall spindle carriers, the Cincinnati 0-8 can perform over 350 different operating cycles. Cycles changed in less than 60 seconds with pre-set cam cycle selectors. Whether singly or in batteries, the 0-8 Plain Auto. will increase your production.

✱ Fully illustrated in catalogue M.1607.



British-built 1-18 Plain Automatic Millers are proving their worth in metal-working plants throughout the world. Extremely robust in construction, the 1-18 tackles small or large quantity production or both with equal dexterity. Like the 0-8, table cycles are initiated by movement of a single lever, and conventional and "climb-milling" operations are performed without any trouble with the built-in Automatic Backlash Eliminator.

Rugged—Reliable—Rewarding—the 1-18 Plain Auto. should be your choice automatically.

✱ Specifications in catalogue M.1555-E.

Write for catalogues and information to:—
CHARLES CHURCHILL & CO. LTD.,
 LONDON, BIRMINGHAM, GLASGOW,
 MANCHESTER & GATESHEAD.

All work comes alike to a Crowthorn

The new 10 $\frac{1}{2}$ in. H.D. lathe enhances still further the Crowthorn reputation for versatility and quality. Extra strength and improved design are matched by many entirely new features, for example:—

Larger hollow spindle, 3 $\frac{1}{2}$ in. bore.

Larger gap 36in. swing by 15 $\frac{1}{2}$ in. width.

Completely redesigned bed.

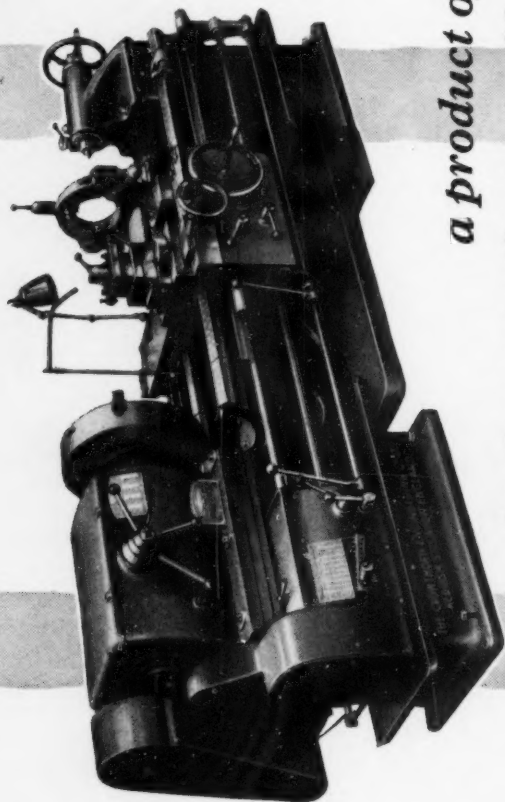
Larger and more powerful headstock for heavier cuts and higher speeds.

Redesigned tailstock.

Electric suds pump.

Please write for detailed literature on this outstanding new lathe.

Other famous models in the Crowthorn range include Centre Lathes from 7 $\frac{1}{2}$ in. to 20in. centres, 30in. and 36in. swing Boring and Facing Lathes, 12in. to 24in. centres, 18in. and 24in. swing Turret Lathes and 15 $\frac{1}{2}$ in. stroke Shaping Machines.



the new 10 $\frac{1}{2}$ " (21" swing) H.D. Model CENTRE LATHE

*a product of 50 YEARS experience
in the manufacture of high class machine tools*

CROWTHORN
HIGH CLASS MACHINE TOOL MAKERS

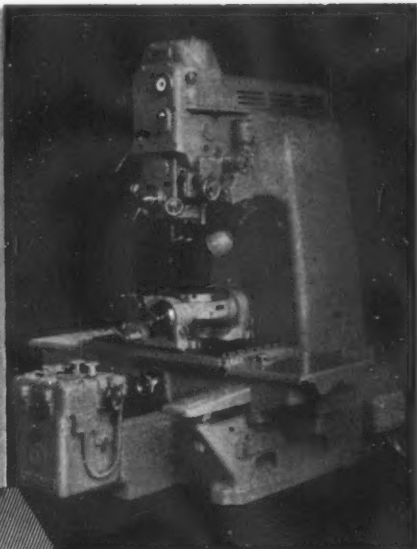
CROWTHORN, ENGINEERING COMPANY LIMITED
REDDISH STOCKPORT ENGLAND

Phone: STOCKPORT 7771-2,3 Grams: CROWTOOL REDDISH

When answering advertisements kindly mention MACHINERY.

LINDNER

- Optical adjustment
- Measuring system free from wear
- Pre-selection of adjustments
- Projection optics
- Open-front design
- Automatic locking and releasing of the co-ordinate table and boring head
- Centralized lubrication



**SETTING
ACCURACY
WITHIN 0.00004in.**

SOLE AGENTS FOR GT. BRITAIN:

STEDALL MACHINE TOOL CO.

**145-157 ST. JOHN STREET,
CLERKENWELL, LONDON, E.C.1**

Telephone: Clerkenwell 1010 Telegrams: Lockstone-Smith, London.

When answering advertisements kindly mention MACHINERY.

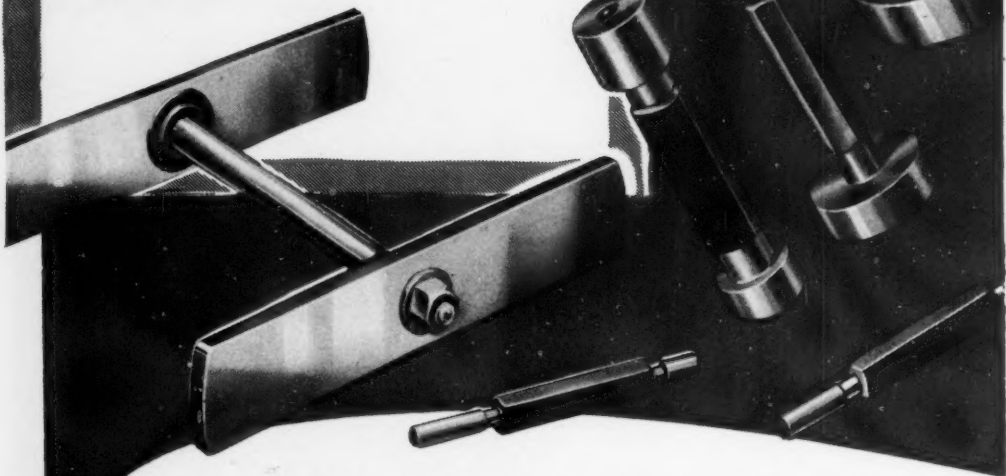


LARGE OR SMALL...

SINGLE END OR DOUBLE END STEEL OR CHROME...

With special plant and long experience we offer exceptional facilities for the production of plug gauges of every size in Steel or Hard Chrome plated, and to customer's own requirements. Reconditioning too... at three quarters the cost of a new gauge. We shall be pleased to advise on your own gauging problems. Get in touch with us.

BROCHURE AND PRICE LIST ON REQUEST



★ YOU CAN ALWAYS DEPEND ON HIGH QUALITY FROM

FBH

DURACHROME

Our ONLY address:

F.B.H. DURACHROME LTD., KINGS NORTON, BIRMINGHAM, 30
TELEPHONE: KINGS NORTON 1911 AND 2486

A.I.D. APPROVED

When answering advertisements kindly mention MACHINERY.



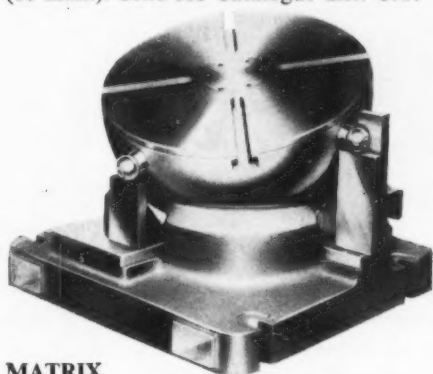
HIGH PRECISION CIRCULAR TABLES

MACHINERY November 19, 1958 5



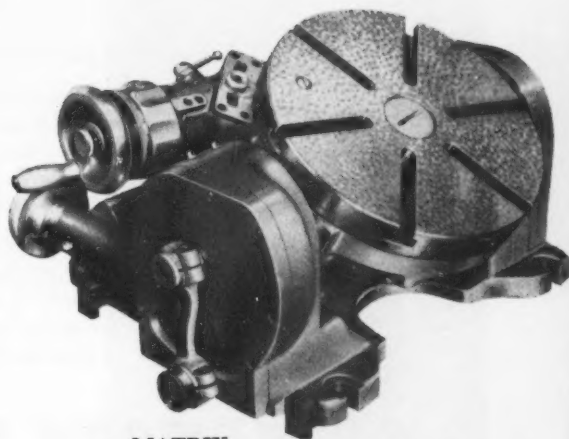
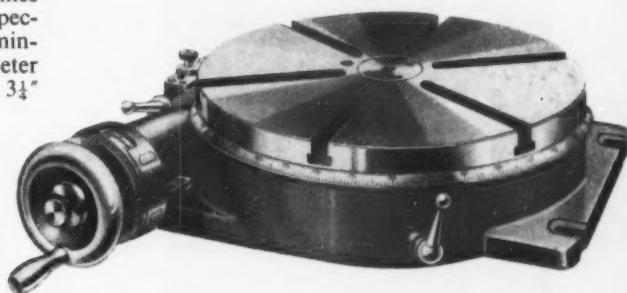
MATRIX 12" CIRCULAR TABLE

Designed for use on small jig boring machines and light milling machines as well as for inspection purposes. Table readings direct to one minute of arc and five seconds by vernier. Diameter of table 12" (300 m.m.). Total overall height 3½" (80 m.m.). Send for Catalogue Ref. C.T.



MATRIX COMPOUND ANGLE SINE TABLE

The outstanding feature of this table is the substitution for the conventional hinged bearings at 90° of a hemisphere riding in a spherical seating and permitting any angle up to 45° to be set as a single or compound angle. Diameter of working surface 9" (230 m.m.). It is accurate to within ten seconds of arc and can be used equally well for the inspection of jigs and gauges and for the manufacture of components. Send for Catalogue Ref. CAST.



MATRIX 8" INCLINABLE CIRCULAR TABLE

This extremely compact 8" (200 m.m.) diameter table has been designed for use on small jig boring machines, for light milling operations, and is an invaluable piece of inspection equipment. Angular inclinations read by means of built-in vernier to one minute of arc. Circular divisions to five seconds by vernier. Send for Catalogue Ref. I.C.T.

Coventry Gauge

& TOOL COMPANY LTD

PO BOX 31 COVENTRY CT BRITAIN





What happens at Newbury

Ingenuity, backed by technical "know how" enabled the famous Racecourse at Newbury to become one of the most popular racing centres in the country—famed for its first-class amenities, efficient appointments and its constant attention to the well-being of its many patrons.



Single Reduction Fan Cooled Worm Gear Units. Vertical output shaft. For transmitting powers up to 110 h.p. Ratios 3:1 to 100:1

Although we at Oppermans offer no Gold Cup, we do offer all the skill, resources and technical "know how" acquired in our many years in the Gear industry. These facilities are at your disposal—we do hope that you will make use of them by sending your enquiries to Oppermans of Newbury.

OPPERMANS OF NEWBURY

Manufacturers of Geared Units

OPPERMAN GEARS LTD · NEWBURY · BERKSHIRE

Tel: Newbury 1701. Telegrams: Oppigears, Newbury

When answering advertisements kindly mention MACHINERY.



**THE BEST PORTABLE TOOL
MAKERS SPECIFY . . .**

Jacobs CHUCKS

- * FOR GRIPPING POWER
- * HIGH PRECISION
- * PROVEN LONG LIFE

The severest critic could not deny JACOBS' claim to these fundamental virtues, and, in the final analysis, what more is required of a chuck?

Such has been the conclusion of the leading portable tool manufacturers, who enhance the reputation of their product by fitting JACOBS chucks.

THE JACOBS MANUFACTURING CO. LTD.
MILLMOUSES, SHEFFIELD, S.

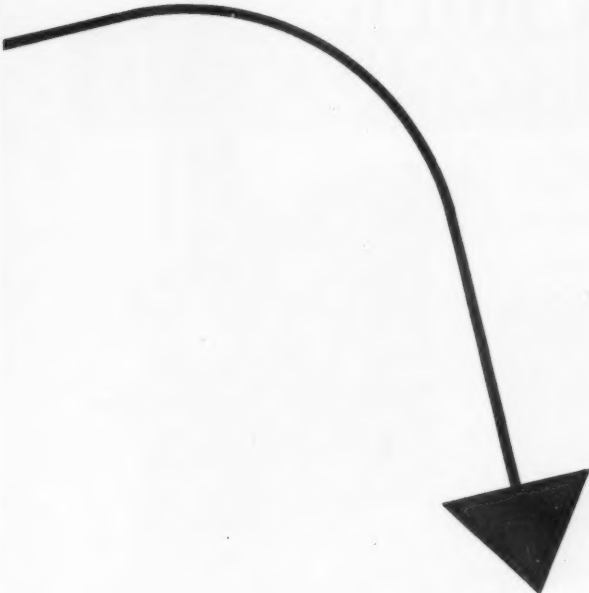
IF IT'S A
JACOBS
IT HOLDS

When answering advertisements kindly mention MACHINERY.

Specify

SPEEDICUT
tools





Our customer produces Iron Pipe fittings. Normal tap life when machine tapping was only 40/50 components. A Technical Representative from Speedicut Works studied the problem and made recommendations on design and treatment which increased tap life on this operation to over 1,500 components.

Take advantage of the latest techniques in tool making—SPECIFY SPEEDICUT.

F. B. T.
F. B. T. BROWN TOOLS LTD.
SPEEDICUT WORKS, CARLISLE STREET EAST,
SHEFFIELD

800 SHOTS AN HOUR

with the IMP/96 die caster

Depending on weight per shot, this air-operated impact die caster will make up to 800 shots per hour. Production is thereby increased and larger machines in the foundry made available for dealing with the bigger articles.

Moreover, castings have greater uniformity and precision — thanks to the new-type injection cylinder and air-operated die unit, which exert higher pressure on the molten metal. Production of the larger, heavier castings is accordingly simplified. The IMP/96 operates on a standard 80 p.s.i. airline and consumes as little as .55 cu. ft. of free air per operating cycle. Write now for full details.

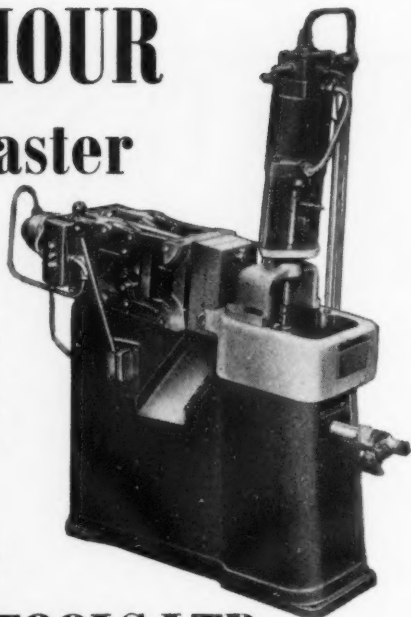
DIE CASTING SERVICE

We can supply larger castings up to a weight of 1½ lbs. in Aluminium Alloy and 4 lbs. in Zinc Alloy. Send us *your* die casting problem! We also specialize in packaging, pressing, assemblies and spray painting.

DIE CASTING MACHINE TOOLS LTD.

DIE CASTING DIVISION:

River Works, 152 Green Lanes, Palmers Green, London, N.13, England
Tel: PAL 2271. Grams: Diemechs, Wood, London. Cables: Diemechs, London
and at New York, N.Y., U.S.A., and Los Angeles, Calif., U.S.A.



DESIGNED ESPECIALLY
FOR DIE CASTING PLANTS

AR/200

200 lb. REVERBERATORY
FURNACE

500 lb. Capacity also available

A complete, self-contained unit for aluminium.

- NO CRUCIBLE • MINIMUM HEAT RADIATED
- LOW MAINTENANCE COSTS • LOW METAL LOSS
- AUTOMATIC ATMOSPHERE CONTROL AND BYPASS • LARGE CLEANING AND CHARGING DOOR



Obtainable direct from:

A.G.M. INDUSTRIES LTD.

MANUFACTURERS OF BALE-OUT FURNACES
FOR ZINC, ALUMINIUM, LEAD AND TIN
152 GREEN LANES, LONDON, N.13

Phone: Palmers Green 8230

ALFRED HERBERT LTD.

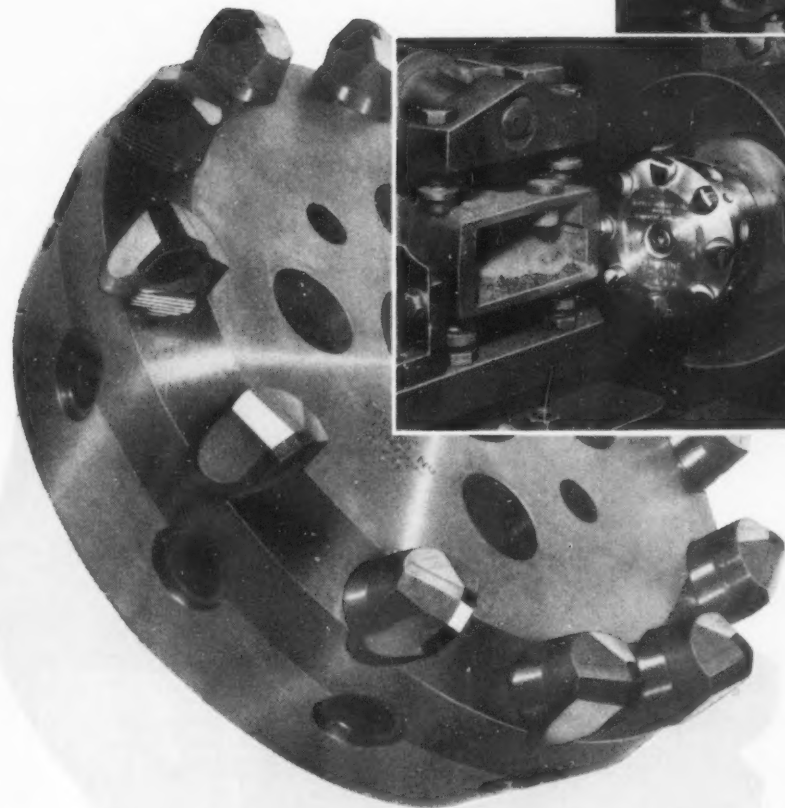
FACTORED DIVISION
RED LANE WORKS, COVENTRY

Phone: 89221 (10 lines)

or

When answering advertisements kindly mention MACHINERY.

THE TOOLS YOU NEED



Inserted-tooth face milling cutters designed for specific operations on various materials. Provide for milling operations on low, medium and high-powered machines.

Give high production with improved finish.

Cutters, high-speed or Ardoloy-tipped, with relative grade of carbide and/or cutting angles for various materials, are interchangeable on the general-purpose High-power Carbiface illustrated.

Cutters from 3in. to 16in. diameter with 5 to 20 blades available.

Patent tooth locking arrangement.

ALFRED

HERBERT

LTD., COVENTRY



AD 442

When answering advertisements kindly mention MACHINERY.

Manufacturers of High Quality Tools



GEO. WALKER & SONS
(BIRMINGHAM) LTD.

WARWICK RD, TYSELEY, BIRMINGHAM, 11



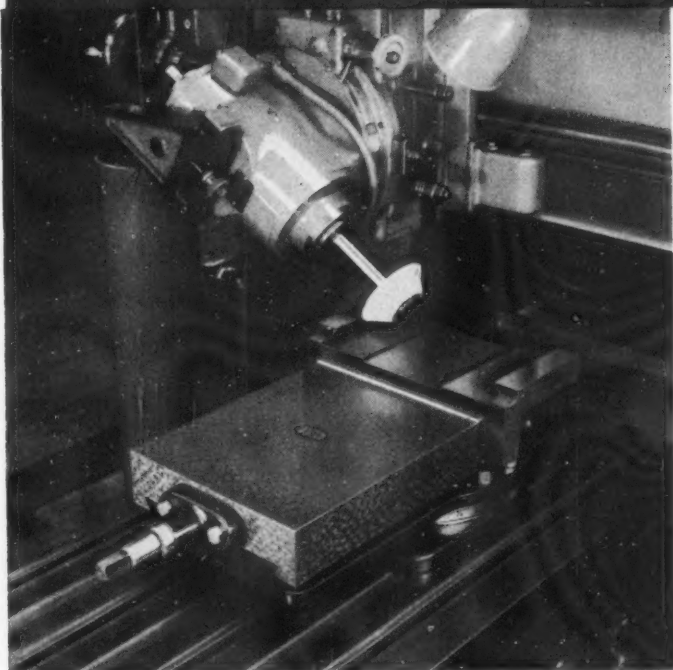
TELEPHONE:
ACOCKS
[Green 4161]

DRILLS . . . ETC . ETC . ETC

When answering advertisements kindly mention MACHINERY.



For Accuracy Plus Durability



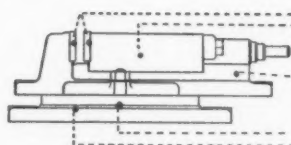
Grinding Vee Slides of drill jig using Abwood Machine Vice for ease of set-up. This set-up precludes any possibility of lift, thus ensuring all faces being square and/or parallel.

THE ABWOOD MODERN MACHINE VICE



**FULL RANGE OF SIZES
AND TYPES FROM 3" to 15"**

VISUALISE WHAT AN IMMENSE SAVING THIS MEANS



- PRECISION GROUND CARBON STEEL JAWS
- SLIDING JAW MACHINED OVER THE WHOLE OF ITS SURFACE FOR USE OF SCRIBING BLOCK
- ENCLOSED SQUARE THREAD SCREW HARDENED ON THE END AND 'THRUST'
- MACHINE DIVIDED SWIVEL BASE INDEXED THROUGH 360°
- ALL CASTINGS IN HIGH TENSILE "MEEHANITE"

ABWOOD MACHINE TOOLS LTD, PRINCES ROAD, DARTFORD, KENT

Telephone: Dartford 5271 (5 lines)



Telegrams: ABWOOD, DARTFORD

MV-2

When answering advertisements kindly mention MACHINERY.

RAYBROOK

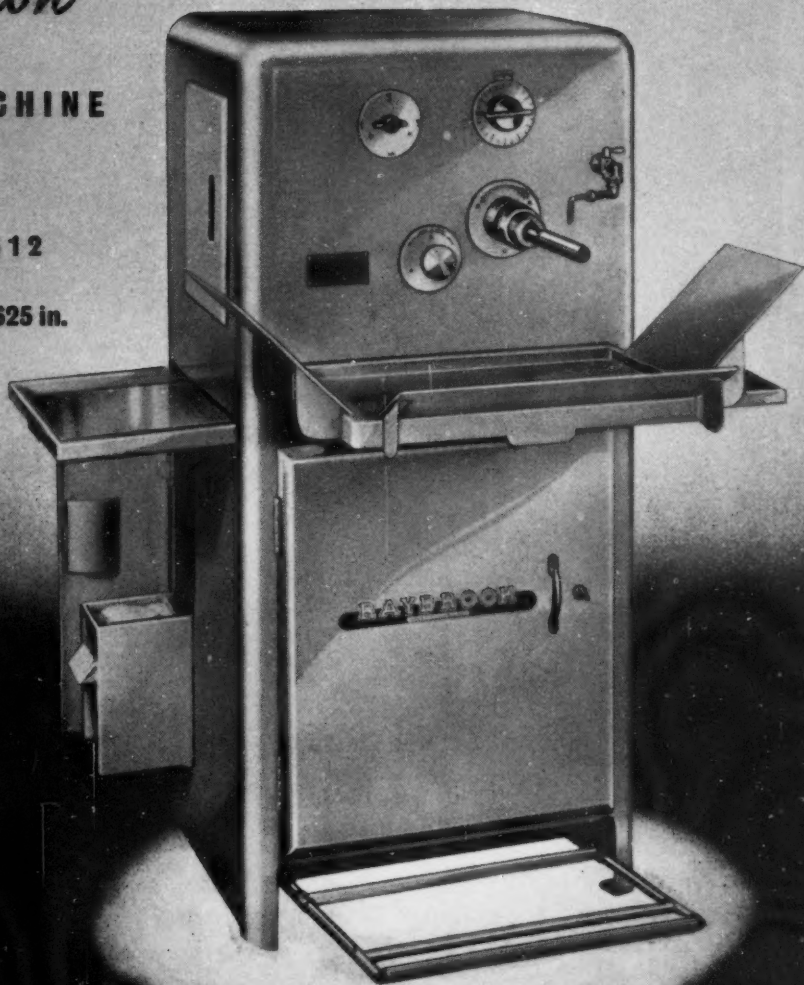
Precision

HONING MACHINE

MODEL 312

Capacity:

120 in. to 2'625 in.



Note the storage for
mandrels, stones, etc.

RAYBROOK PRECISION HONING CO., LTD.

DURKAR LOW LANE, WAKEFIELD, YORKSHIRE

TEL. WAKEFIELD 2665

SOUTHERN AGENT: G. E. SUMMERSBY, 55 Sidmouth Street, Grays Inn Road, LONDON, W.C.1

NOBLE & LUND

fluifeed

VERTICAL COLD CIRCULAR SAWING MACHINES

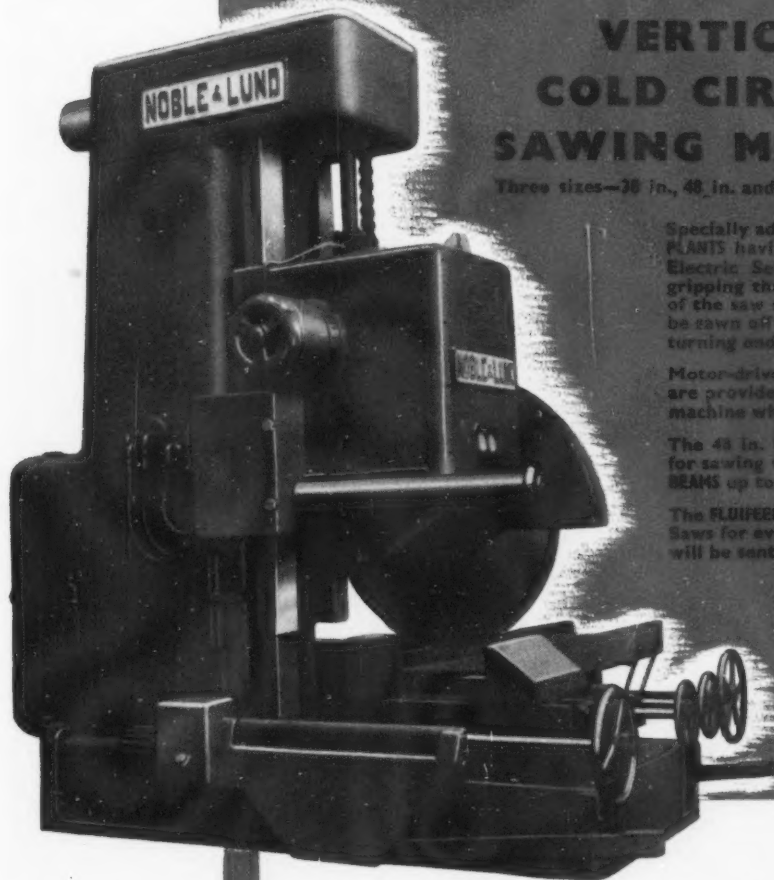
Three sizes—36 in., 48 in. and 54 in. dia. Saw Blades.

Specially adapted for AUTOMATION PLANTS having twin hydraulic or Electric Self-centring rams, for gripping the work on either side of the saw so that the work can be sawn off at both ends without turning end-for-end.

Motor-driven live work rollers are provided at each side of the machine when required.

The 48 in. Machine has capacity for sawing the new BROAD FLANGE BEAMS up to 36 in. by 14½ in.

The FLUIFEED range includes Cold Saws for every duty. Full details will be sent on request.



NOBLE & LUND LTD. GATESHEAD, 10

When answering advertisements kindly mention MACHINERY.



for the tough jobs

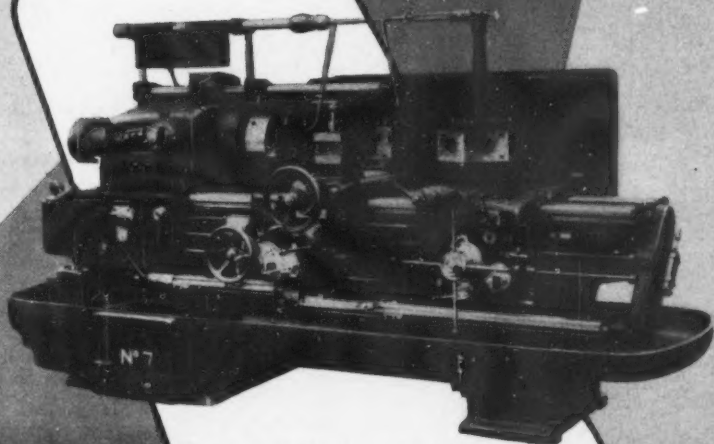
Every day at the "Eclipse" Works a battery of no less than 21 hacksaw machines of different types is constantly at work to make sure that, under practical workshop conditions, "Eclipse" hacksaw blades stand up to the most arduous tasks imposed by new materials and new production methods. This is just one of the reasons why "Eclipse" hacksaw blades give you the best value and utmost reliability.

Eclipse hacksaw blades & other tools are made by James Neill & Co. (Sheffield) Ltd, and are obtainable from all tool distributors

For Maximum Production

**No.7 'PRELECTOR'
Turret Lathe**

Ward



- Patent hydraulic pre-selecting head-stock
- 12 spindle speeds, both forward and reverse, (25-1,000 r.p.m.)
- Bed protected by stainless steel covers
- Screw-cutting motion
- Automatic lubrication
- Quick power traverse
- 2½ in. bar 16 in. swing

Full details of our complete range of Capstan and Turret Lathes on request.

**H.W. WARD & CO
LTD**

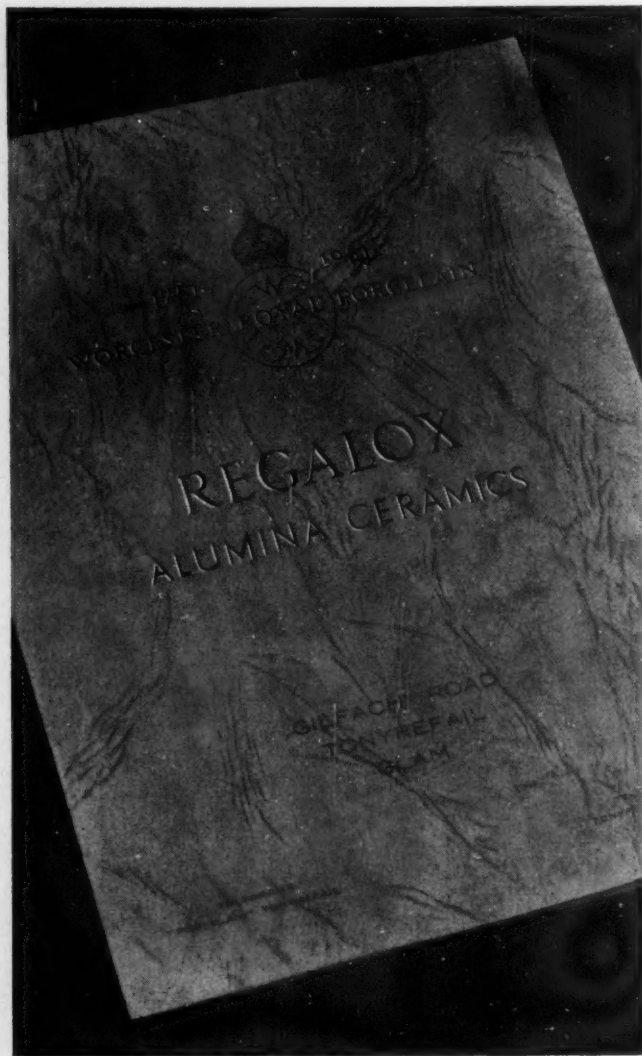
**SELY OAK
BIRMINGHAM 29**
TELEPHONE SELLY OAK 1131



W667

* When answering advertisements kindly mention **MACHINERY**.

B



*New techniques
present
new problems*

HARD ENGINEERING CERAMICS CAN BE THE SOLUTION

With a hardness between diamond and sapphire, highly resistant to wear and possessing excellent physical properties, REGALOX hard ceramics have been the solution to many difficult problems in the engineering industry—chemical—mechanical—electrical.

OUTSTANDING ADVANTAGES

- WEAR & HEAT RESISTANT
- DIMENSIONALLY STABLE UNDER ALL CONDITIONS
- LOW CO-EFFICIENT OF FRICTION
- HIGH PHYSICAL PROPERTIES

Our Technical Development Advisory Service is immediately available to tell you where REGALOX can be applied with advantage to your own products.

*Already in use for
fig bushes, plug gauges,
tool tips, wire guides, textile
guides, grinding balls, etc.*

*Write now for this free
catalogue and test piece*



**THE WORCESTER ROYAL PORCELAIN COMPANY LIMITED
INDUSTRIAL CERAMICS DIVISION**

Sales Department—TONYREFAIL, GLAMORGAN, SOUTH WALES
Telephone: TONYREFAIL 135/136 Telegrams: PORCELAIN, TONYREFAIL



**REGALOX
ALUMINA CERAMICS**

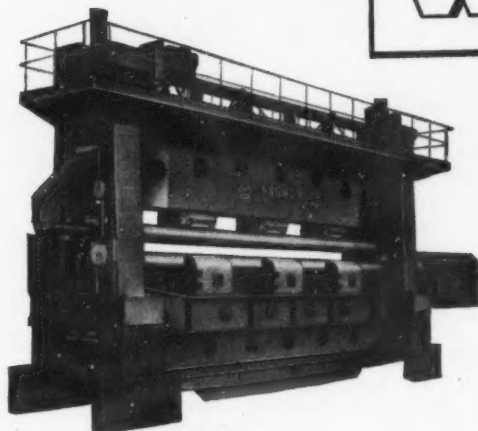
NEARLY DIAMOND HARD

When answering advertisements kindly mention MACHINERY.

modern shipbuilding equipment by

WAGNER

OF DORTMUND



WAGNER

SHIP & MARINE ENGINE BUILDING MACHINES

SHIP PLATE BENDING MACHINES
with or without pre-bending.

HYDRAULIC BENDING MACHINES
from 160 tons.

THREE-ROLL BENDING MACHINES
with or without pre-bending.

FOUR-ROLL BENDING MACHINES
for plates from $\frac{3}{8}$ in. thick.

SHIP RIB BENDING MACHINES
for sections up to 16 in. deep.

ROLLER SECTION BENDING MACHINES
with or without pre-bending.

Please let us demonstrate to you.

VAUGHAN

ASSOCIATES LIMITED

PLATE STRAIGHTENING MACHINES
for plates from $\frac{3}{8}$ in. thick.

DOUBLE STANDARD PLATE SHEARS
for plates from $\frac{3}{8}$ in. thick.

CIRCULAR CUTTER SHEARS
for plates from $\frac{3}{8}$ in. thick.

CIRCULAR CUTTER TRIMMING SHEARS
for trimming both sides and slitting plates from $\frac{3}{8}$ in. thick.

ROLL SHEARS
also with planing attachment for plates $\frac{3}{8}$ in. thick.

PLATE EDGE PLANING MACHINES
with rack or screw drive, cutting power from 1-2 tons.

PUNCHING MACHINES
from 160 tons.

LEVER PUNCHING MACHINES AND SHEARS
single and combined, from 160 tons.

**WATER HYDRAULIC AND OIL HYDRAULIC
SHIPBUILDING PRESSES**
from 160 tons.

**OIL HYDRAULIC STRAIGHTENING AND
BENDING PRESSES**
from 125 tons.

**MECHANICAL STRAIGHTENING AND
BENDING PRESSES**
from 200 tons.

HYDRAULIC PRESS BRAKES
from 160 tons.

MECHANICAL PRESS BRAKES
from 200 tons.

SINGLE STANDARD ECCENTRIC PRESSES
single and double sided from 200 tons.

DOUBLE STANDARD CRANK PRESSES
from 200 tons.

JOGGING AND FLANGING PRESSES
from 200 tons.

HYDRAULIC RAPID FORGING PRESSES
from 200 tons.

STEAM AND PNEUMATIC HAMMERS

4 QUEEN STREET • CURZON STREET • LONDON • W.1 Tel: GROsvenor 8342

Midland Office and Demonstration Room: WILFORD CRESCENT • NOTTINGHAM Tel: NOTT 88008
NRP

When answering advertisements kindly mention MACHINERY.

why pick on us?

Yes, why? asks the motorist, faced with yet another demand on his purse—parking meters. Well, it's a good question, and maybe the Minister of Transport knows the answer. But if you've got to pay, you've got to pay—and here's a meter that'll make it almost a pleasure (road funds to you, too!). It's the Duncan Miller Model 60, now being made in this country by Adams Powel Equipment Ltd. *They* picked on us to cast the parts —90% of them in zinc. The largest weighs 5½ lbs., the smallest 0.013 lbs. Have *you* got a pressure die casting problem? Come and park it on us.



the whole in one



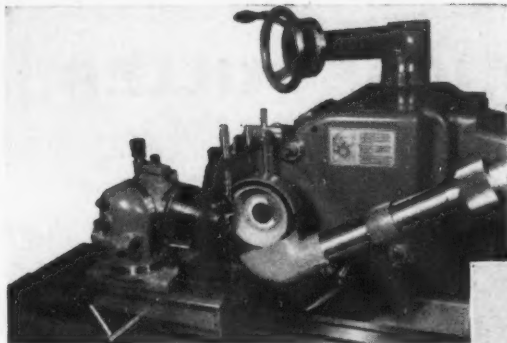
BRITISH DIE CASTING AND ENGINEERING COMPANY LTD.

EDWARD ROAD, NEW BARNET, HERTFORDSHIRE. TELEPHONE: BARNET 9211.

Also at WEST CHIRTON TRADING ESTATE, NORTH SHIELDS, NORTHUMBERLAND NORTH SHIELDS 2100.

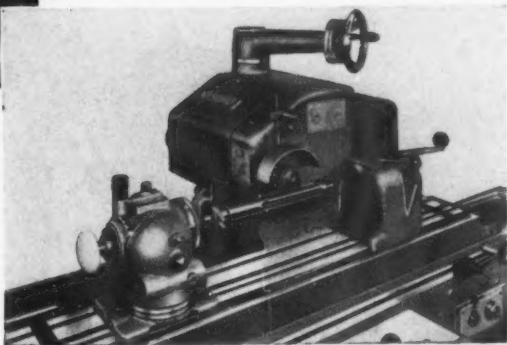
CRC 33

When answering advertisements kindly mention MACHINERY.



*precision
grinding
with ---*

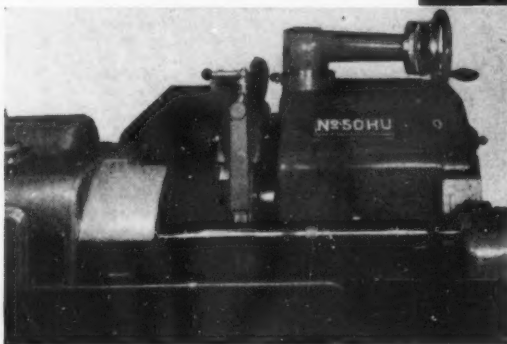
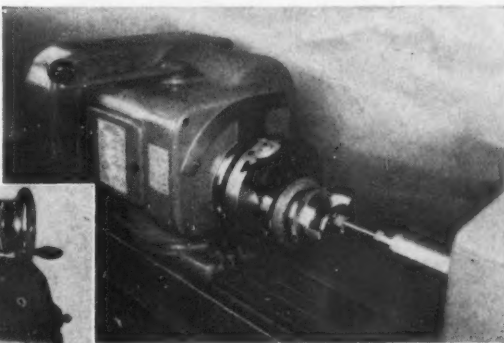
The ideal machine for **FACE,
CYLINDRICAL, INTERNAL
SURFACE, TOOL AND
CUTTER** grinding.



--- KELLENBERGER *universal grinders*

Features include adjustable table for taper grinding. Wheelhead and workhead with 360° swivel. Six rates of automatic table traverse. Automatic in-feed to wheelhead.

Three sizes 29½", 46½" and 59" between centres.



Kellenberger also offer a Tool and Cutter Grinder with 30½" or 36½" between centres.

Full details from sole agents:—

ALFRED

HERBERT

LTD. COVENTRY

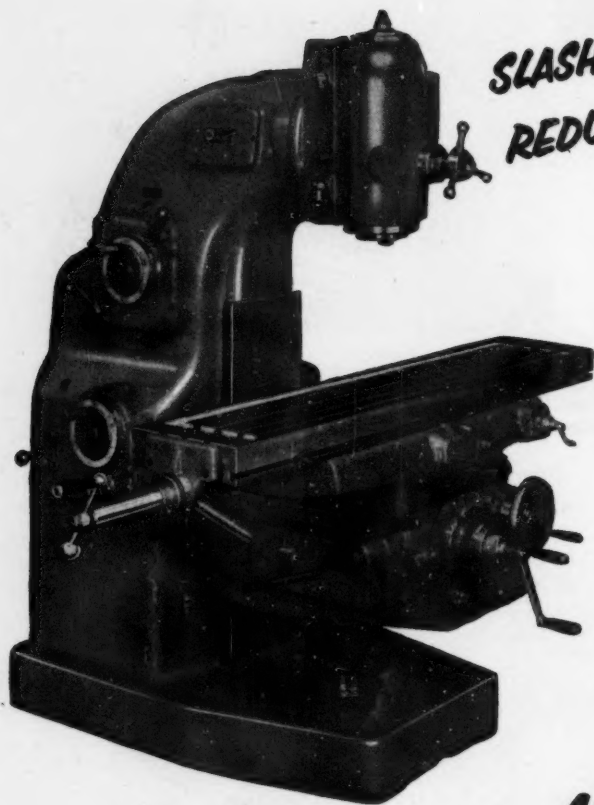
Factored Division, Red Lane Works.



AD432

ARNO VERTICAL MILLER

3 L DIAL TYPE



**SLASHES PRODUCTION COSTS!
REDUCES OPERATOR FATIGUE!**

NOTE THESE FEATURES.

- ★ Dial change speeds and feeds.
- ★ Three-way power traverses.
- ★ Spindle stop, feeds and rapid traverses by single lever.
- ★ Backlash eliminator.
- ★ Hardened and ground gears.
- ★ Swivelling and sliding head.
- ★ Centralised controls.
- ★ Table 60" x 12"
- ★ H.P. 9½.
- ★ Schlesinger limits.

AND THE PRICE?

—£2,100

EX-LONDON WORKS

Also:

Nos. 1, 2, 3L, 3H Vertical Millers.
Nos. 0, 2, 3 Universals.
No. 5 Facing & Boring Miller.

For further details of ARNO Millers, write, phone or call—

**HELMET ROW, OLD STREET, LONDON, E.C.1.
TELEPHONE: CLE: 6481.**

PIDGEN BROS
LIMITED

When answering advertisements kindly mention **MACHINERY**.

IMPERIA

RANGE OF GRINDERS



UNIVERSAL TOOL
AND
CUTTER GRINDER
Type M6 AR

These machines are precision made and an exceptionally comprehensive range of standard equipment is included in the very moderate price.

Special features are the *Power Feed to Table* and the equipment for *Wet Grinding*.

BRIEF SPECIFICATION OF TYPE M6 A.R.

Dia. of grinding wheels	8"
Working surface of table	32" x 5"
Longitudinal movement of table	13 1/2"
Cross movement of table	7 1/2"
Min. height of grinding wheel over table	2"
Vertical movement of grinding wheel spindle	7"
Height of centres	5"
Max. distance between centres	20"
* Motorised	400/3/50

Full details from

Sole Agents

GEORGE COHEN

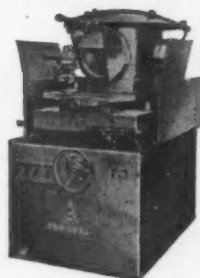
SONS AND COMPANY LIMITED



SUNBEAM ROAD, LONDON, N.W.10 : TEL: ELGAR 7222 : STANNINGLEY, NR. LEEDS : TEL: PUDSEY 3241

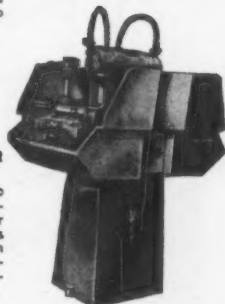
ROTARY HEAD CARBIDE TOOL GRINDER Type MO 14

Supplied with four grinding wheels mounted on rotary head, for roughing, sharpening, lapping and chip breaking in succession or for single operation of each wheel. Micro adjustment of tool holder, which accommodates all sizes and shapes of tools up to 2 1/2" sq. section.



CARBIDE TOOL GRINDER Type MO 13

Fitted with two wheels, one for sharpening and one for lapping. The various faces of the tool can be ground in succession without removing tool.



CARBIDE TOOL GRINDER Type MO 15

With only one operating post. Fitted with two diamond wheels, one for sharpening, the other for lapping. Tools can be ground all faces without removing.



When answering advertisements kindly mention **MACHINERY**.



MARTONAIR FLOW REGULATORS

Martonair Flow Regulators are used extensively to control the speed of pneumatic cylinders. Normally fitted between the outlet port of the control valve and the cylinder, the regulator allows free flow into the cylinder but controls the flow to exhaust by orifice adjustment. The S.837 regulator illustrated here gives provision for in-line connection and is suitable for the speed control of cylinders up to 4" diameter bore. The taper for the adjusting needle has been specially designed to give not the usual wide parabolic flow curve but equal sensitivity of control at both large and small openings; each turn of the needle involves an increase of approximately 40% on flow and cylinder speed. Precise control can thus be obtained.

Send for leaflet B87 which gives full details of the Martonair S.837 Flow Regulator

MARTONAIR LTD · PARKSHOT · RICHMOND · SURREY
Telephone: RIC 2201 (6 lines)

AD.44

COLD HOBGING PRESSES

BY SACK & KIESSELBACH



Note depth measuring device, automatically stopping machine when required depth has been reached.

ROCKWELL
MACHINE TOOL CO. LTD.

SACK & KIESSELBACH have for many years been building Cold Hobbing Presses. These machines are therefore not adaptations but are designed and built for this work only. Their sound, robust basic design, high quality workmanship plus several special features found only on these machines greatly facilitates the production of sound moulds. Further details on request.

WELSH HARP, EDGWARE ROAD, LONDON, N.W.2. TEL: GLADSTONE 0033

ALSO AT · BIRMINGHAM-TELEPHONE SPRINGFIELD 1134/5 · STOCKPORT-TELEPHONE STOCKPORT 5241 · GLASGOW-TELEPHONE HERRYLEE 2822

SKI

B★

MOST FIRMS CHOOSE—

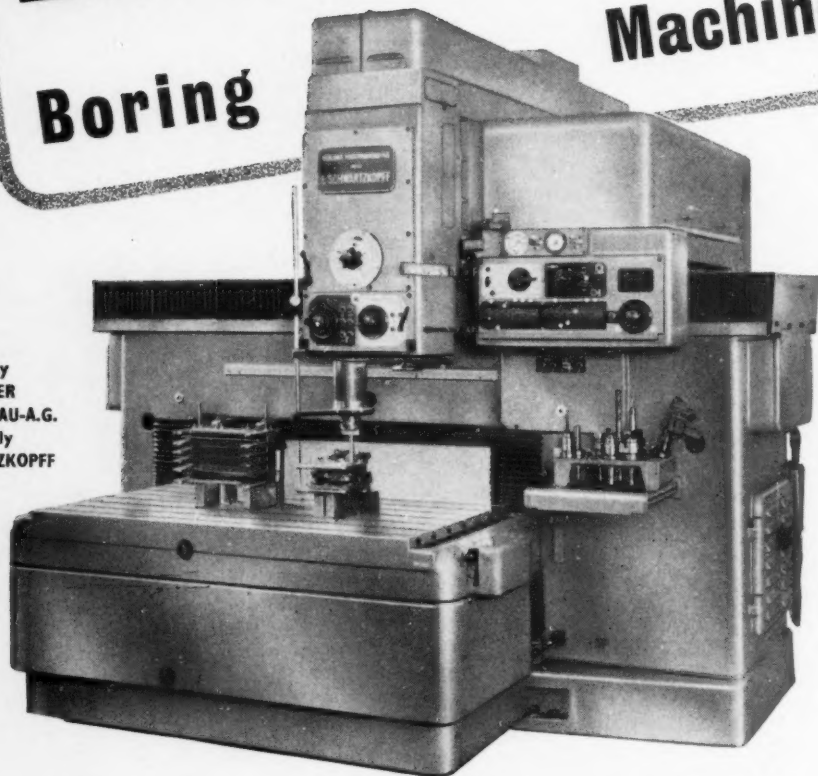
BEMAG

Boring



Machines

Built by
**BERLINER
MASCHINENBAU-A.G.**
Formerly
L. SCHWARTZKOPFF



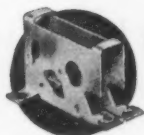
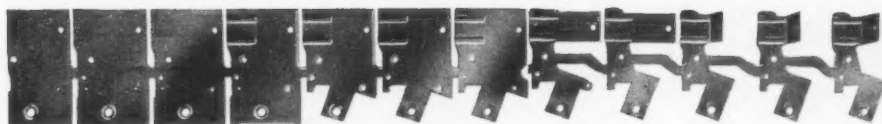
There are more BEMAG punched card controlled, automatic positioning Boring Machines in use in this country than any other make. The BEMAG Production Boring and Milling Machine for JIGLESS Production represents a revolutionary approach to single, batch and mass production Boring and incorporates automatic pre-selection of co-ordinate settings as well as feeds and speeds.

ROCKWELL
MACHINE TOOL CO. LTD.

For further particulars write or telephone TODAY

WELSH HARP, EDGWARE RD., LONDON, N.W.2. TEL: GLADSTONE 0033

ALSO AT BIRMINGHAM—TEL: SPRINGFIELD 1134/5 • STOCKPORT—TEL: STOCKPORT 5241 • GLASGOW—TEL: MERRYLEE 2022

BRITISH-BUILT**MACHINES****offer new opportunities****to produce** *Intricate Stampings***automatically and cheaply!**

Most stampings, from simple brackets to intricate parts, which previously required operations on several presses, each with its own operator, can now be produced automatically with great accuracy, at high speed, on *ONE* British-Built U.S. Multi-Slide Machine. If you use a number of presses to produce stampings or if you use progression tools for parts made from coiled material up to 3½" wide, here are reasons why we are almost certain to be able to send you a most interesting proposal.

1. The extreme accuracy of the feed employed and the fact that bending tools can be adjusted independently

makes it much easier to obtain a high quality part. 2. Sturdy construction of machine and its attachments as well as instantaneous braking through monitoring devices, increase tool life and reduce risk of tool breakages.

3. Material is saved because no extra material width is usually required either for piloting or side-cropping. The developed blank is in continuous strip, *not* held in a material webbing which becomes scrap. Material savings up to 25 per cent. are possible. In some cases production can be doubled by making two components from one strip.

ROCKWELL
 MACHINE TOOL CO. LTD.

For further particulars write or telephone TODAY
WELSH HARP, EDGWARE RD., LONDON, N.W.2. TEL: GLADSTONE 0033
ALSO AT BIRMINGHAM—TEL: SPRINGFIELD 1134/5 • STOCKPORT—TEL: STOCKPORT 5241 • GLASGOW—TEL: MERRYLEE 2822

Grinds Spiral Cutters and Clearance Angles by **DIRECT SETTING**

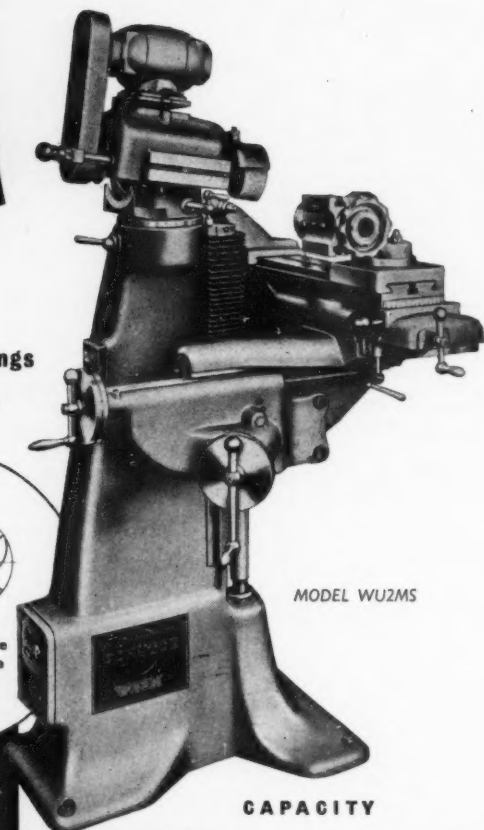
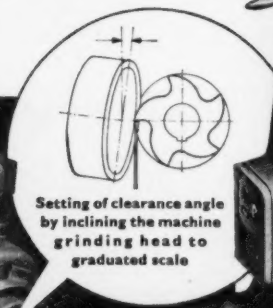
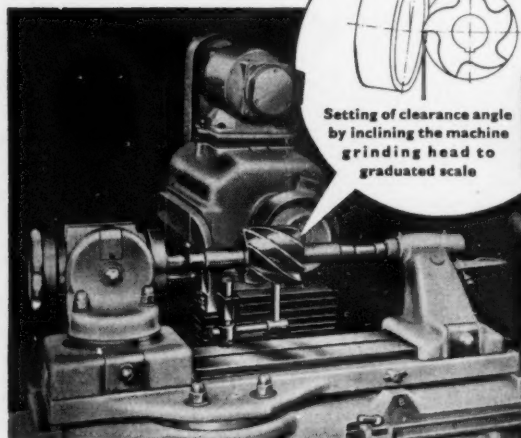
SCHÜTTE
TOOL and CUTTER
GRINDING MACHINE

Head Swivels and TILTS

Grinding Spindle runs in Ball Bearings

Precision Ball Bearing Track Table

Sensitive Table
Movement



CAPACITY

Centre height	...	...	...	4 $\frac{1}{2}$ "
Grinding diameter	...	...	...	Max. 10"
Centre distance—grinding length	...	...	...	12 $\frac{1}{2}$ "
Helix angle adjustment (right and left hand)	...	...	...	60°-0°-60°
Clearance angle inclinability	...	...	...	12°-0°-12°
2 Grinding Spindle Speeds	appr. RPM	3000/6000		

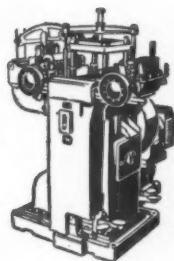
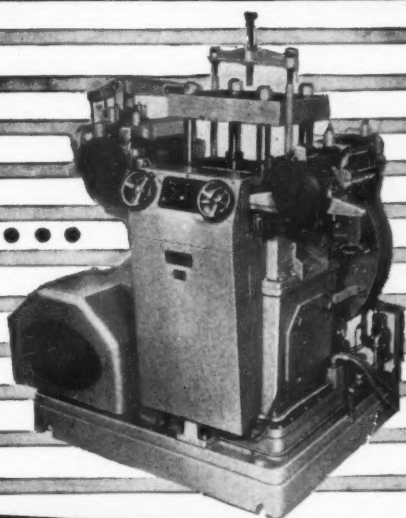
Write for detailed literature to:—

WELSH HARP, EDWARE ROAD, LONDON, N.W.2. TELEPHONE: GLADSTONE 0033

ALSO AT • BIRMINGHAM—TELEPHONE SPRINGFIELD 1134/5 • STOCKPORT—TELEPHONE STOCKPORT 5241 • GLASGOW—TELEPHONE MERRYLEE 2827
SCH5

ROCKWELL
MACHINE TOOL CO. LTD.

When answering advertisements kindly mention MACHINERY.

**10 TON MODEL**

3 speed ranges from 75 to 500 strokes per minute—
5 h.p. variable speed motor—maximum stock width
5" x 3/32" thick.



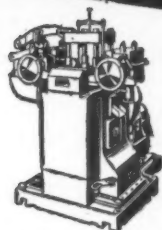
High Speed DIEING PRESSES

50 TON MODEL

4 speed ranges from 45 to 300 strokes per minute—12 h.p. variable speed motor—maximum stock width 12 1/2" x 3/16" thick.

100 TON MODEL

2 speed ranges from 50 to 200 strokes per minute—30 h.p. motor—maximum stock width 15" x 1/4" thick.

**25 TON MODEL**

4 speed ranges from 60 to 600 strokes per minute—
7 1/2 h.p. variable speed motor—maximum stock width
6 1/2" x 1/8" thick.

Power with a Punch!

E.H. JONES
(MACHINE TOOLS) LTD

You will obtain **MORE COMPONENTS PER HOUR PER SQUARE FOOT OF FLOOR AREA** from C.V.A. Dieing Presses.

**GARANTOOLS HOUSE
PORTLAND ROAD, HOVE, SUSSEX**

Telephone: HOVE 47253 Telegrams: Garantools, Portslade

LONDON • BIRMINGHAM • EDINBURGH • MANCHESTER • BRISTOL

NRP

When answering advertisements kindly mention **MACHINERY**.



**WILD-BARFIELD
A.H.F.
equipment at
LOCKHEED
HYDRAULIC BRAKE CO.**

A battery of three Wild-Barfield A.H.F. 7½ kW. equipments issued by Lockheed Hydraulic Brake Co. at their Leamington factory for induction soldering tanks to brake master cylinders. Many other industrial concerns have found that Wild-Barfield induction heating speeds production, saves space and offers savings all along the line. Our engineers will be glad to supply further details and explain how Wild-Barfield A.H.F. equipment can help you.



Induction heating speeds production

WILD-BARFIELD ELECTRIC FURNACES LIMITED

ELECFURN WORKS, OTTERSPOOL WAY, WATFORD BY-PASS, WATFORD, HERTS. Telephone: Watford 6091 (8 lines)

WB74

When answering advertisements kindly mention MACHINERY.



GILLY HIGH SPEED HORIZONTAL BORERS

Hundreds of these machines, all over the country, are meeting the most exacting needs for all types of production. They feature ample power—wide range of speeds and feeds—built in swivelling table—continuous automatic facing head—vernier scales and fine setting device—telescopic bed covers—oversize table and extended cross traverse—extended vertical traverse.

TABLE TYPE MACHINES	AFMF 65	*AFMF 80	*AFMF 100	AFMF 130	AFMF 160
Spindle diameter	2½ in.	3½ in.	4 in.	5½ in.	6½ in.
Facing capacity	19½ in.	29½ in.	39½ in.	49½ in.	57 in.
Speed range	10-1,250 r.p.m.	9-1,100 r.p.m.	5-975 r.p.m.	4-700 r.p.m.	2-9-500 r.p.m.
Table surface	28 x 35½ in.	35½ x 44 in.	43½ x 51½ in.	55½ x 63 in.	63 x 70½ in.

GILLY FLOOR TYPE HORIZONTAL BORERS are supplied in four sizes with spindle diameters from 6½ in. to 10 in. dia. Full details on request.

***IMMEDIATE DELIVERY**

Inspection cordially invited

SOAG MACHINE TOOLS LTD. LONDON

JUXON STREET • LAMBETH • S.E.11

PHONE: RELIANCE 7201 • GRAMS: SOTOOLSAG, LONDON, S.E.11

When answering advertisements kindly mention **MACHINERY**.

**"Such satisfactory results
have never been obtained before"
say CUNLIFFE & CROOM of . . .**

HARPER CASTINGS

Of this precision dividing-head plate for milling machines Cunliffe & Croom say, "We find that by using Harper Castings we get a plate with a good clean surface and, equally important, consistent hardness. Each casting has to be drilled with about 2,000 small holes which must have a clean edge and a firm wall between the holes which are extremely close together."

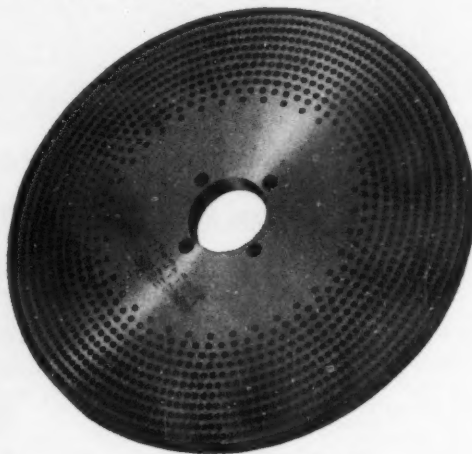
Harper quality covers Grey Iron, Spheroidal Graphite Iron (Mond Nickel Licence) and Meehanite castings.

Also metal pressings, machining, enamelling and other finishes and sub-assembly work.

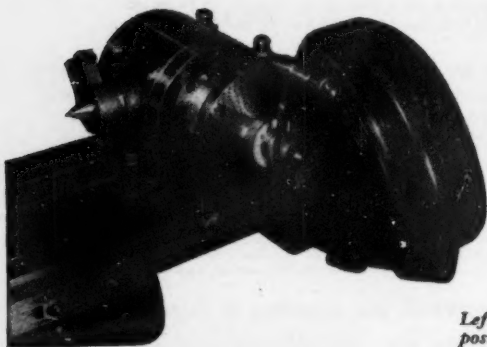
Also makers of the famous Beatrice Oil Heaters and Harper Housewares.



Un-machined casting of dividing-head plate.



Casting machined and drilled.



Left: Finished Casting in position on milling machine.

JOHN HARPER & CO. LTD. JOHN HARPER (MEEHANITE) LTD.
ALBION WORKS Phone: WILLENHALL 124 (5 lines) Grams: HARPERS, WILLENHALL **WILLENHALL**

LONDON OFFICE: SEAFORTH PLACE, 57, BUCKINGHAM GATE, LONDON S.W.1 Tel.: TATE GALLERY 0286

MANCHESTER OFFICE: c/o B. J. Brown & Partners Ltd. 246/9 Royal Exchange, Manchester 2



When answering advertisements kindly mention MACHINERY.

VICTORIA

U2^{AND} V2 MILLING MACHINES

MODEL **U.2**

Power feeds to all table movements.
12 spindle speeds, 31-1010 r.p.m.
18 rates of feed, 0.4-12.25 in./min.
4 h.p. motor.
45" x 11" table.

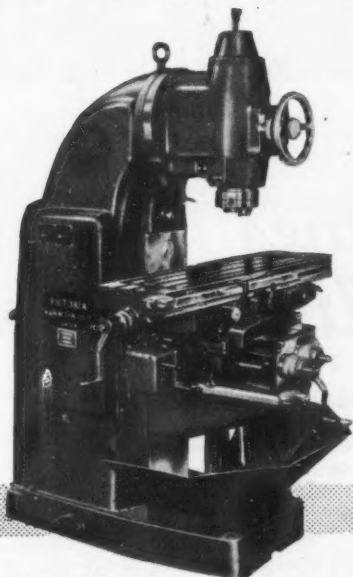
£1135 including 3 phase electrics



MODEL **V.2**

Power feeds to all table movements.
12 spindle speeds, 32-1050 r.p.m.
18 rates of feed, 0.4-12.25 in./min.
4 h.p. motor.
45" x 11" table.

£1220 including 3 phase electrics



INSPECT THESE MACHINES AT OUR SHOWROOMS
OVER 60 MACHINES UNDER POWER

Manufactured by

B. ELLIOTT (MACHINERY) LTD.

(MEMBER OF THE B. ELLIOTT GROUP)

VICTORIA WORKS, WILLESDEN, LONDON, N.W.10

Telephone: ELGar 4050 (10 lines)

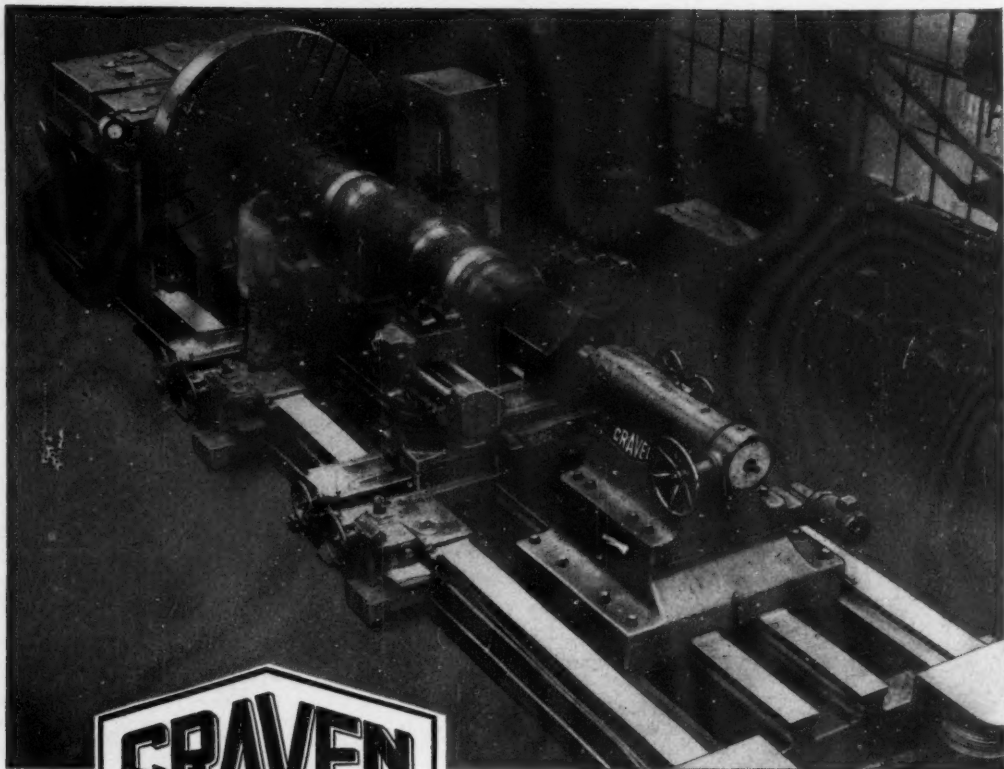
Telegrams: Elliottona, Harles, London

Overseas Subsidiaries: CANADA, U.S.A., AUSTRALIA, S. AFRICA



NRP

When answering advertisements kindly mention **MACHINERY**.



48" Centres Sliding and Surfacing Crankshaft Lathe with interchangeable compound-type and lighthouse-type tool rests.

Heavy Duty Lathes for All Purposes

From 16in. to 100in. Height of Centres

There is a standard or special "Craven" Lathe for every large capacity or heavy duty turning requirement, a wide range of alternative arrangements being available to suit different classes of work. A speciality is made of heavy roll turning lathes and large diesel engine crankshaft lathes, whilst the "break" type of lathe construction is gaining popularity among marine engineers. The "Craven" range includes also high-speed tube boring machines and railway wheel and axle lathes of all types.

CRAVEN BROTHERS (MANCHESTER) LTD
VAUXHALL WORKS · REDDISH · STOCKPORT · ENG

When answering advertisements kindly mention MACHINERY.

INTRODUCING ... a NEW 'ST'

Threading Machine

UNIQUE TAPER THREADING

$\frac{1}{2}$ "—4" TUBE. $\frac{1}{2}$ "—2" BOLT CAPACITY

LEVER RELEASE MECHANISM

SIMPLE TO OPERATE & MAINTAIN

LOW INITIAL COST

NEW 'C' Series Exclusive Features:

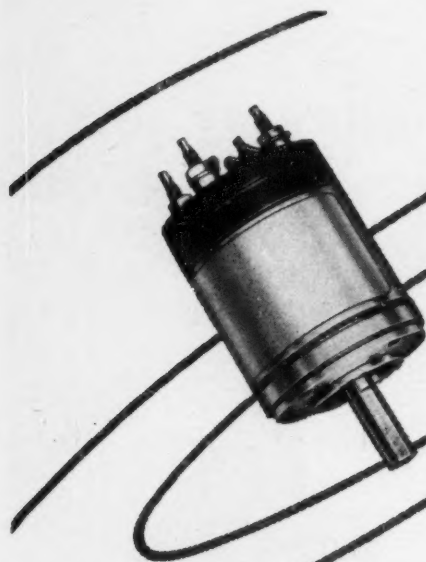
- ★ Totally enclosed headstock automatically lubricated.
- ★ Hammer action vice.
- ★ Replacement steel head.
- ★ Lighter traverse mechanism.
- ★ Large cutting tray with handy removal.

MAIDEN

manufactured by
LANDIS MACHINE—MAIDEN LIMITED
Maiden Division

HYDE · CHESHIRE





For Machine Shop
Applications—
Measurement and
Inspection
Comparators,
Machine Control and
Servo Systems

A.C. Inductive Pick-Offs



Ask for Sperry Brochure No. 767

LINEAR OUTPUT
NO WIPING CONTACTS
INFINITE RESOLUTION
ROBUST CONSTRUCTION

SPERRY Precision Components

SPERRY GYROSCOPE COMPANY LIMITED • GREAT WEST ROAD • BRENTFORD • MIDDLESEX Telephone EALing 6771

When answering advertisements kindly mention MACHINERY.

For Thread Milling Hobs Chasers and Crushing Rolls...

(ground form)



consult



We keep a large stock of standard sizes for every make of machine — made in our London Works from tungsten high-speed steel of the highest grade. Accuracy is guaranteed. We can give prompt delivery of 'specials'.

Also from our London Works

MILLING CUTTERS

Rack milling cutters, multiple annular type.

Worm and profile cutters, single disc type.

Multiple cutters for profile milling flat thread rolling dies and chasers.

Profile cutters for moulds and dies.

Trepanning cutters, Woodruff or T-slot type.

SERRATION CUTTERS

For clamps, pliers, forceps, pipe grips, chucks and similar applications.

HELICAL THREAD ROLLS

THREAD FORM DISCS
FOR CALIPER GAUGES

TUBE SWAGING ROLLS

Ask us to
send our
detailed
catalogue



DOWDING & DOLL LTD

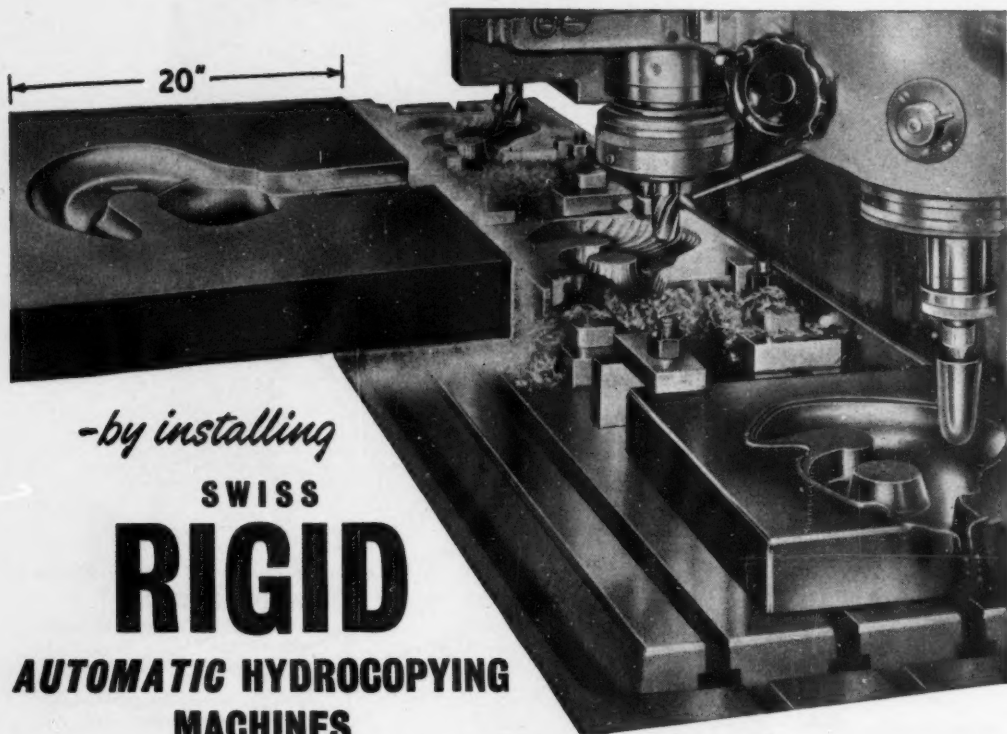
346 KENSINGTON HIGH STREET, LONDON, W.14

Telephone WESTERN 8077 (8 lines)

Telegrams ACCURATOOL HAMMER LONDON

When answering advertisements kindly mention **MACHINERY**.

Solve DIE SINKING and PROFILE MILLING Labour Problems



-by installing

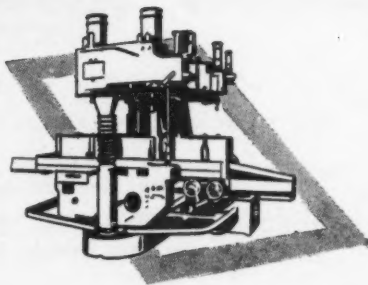
SWISS

RIGID

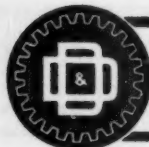
**AUTOMATIC HYDROCOPYING
MACHINES**

Fully automatic copy milling in all three dimensions solves all die sinking and profile milling labour problems once and for all. 360° profiling without circular table and at constant feed. Copies vertical angles up to 90°. Light tracer pressure permits use of wood or plaster models. Reverse image attachment enables top and bottom dies of either hand to be made from the same master.

Standard table sizes up to 92.5" x 25.6"
One, two, four or six spindles



Send for
illustrated
brochure
to Sole U.K.
Distributors



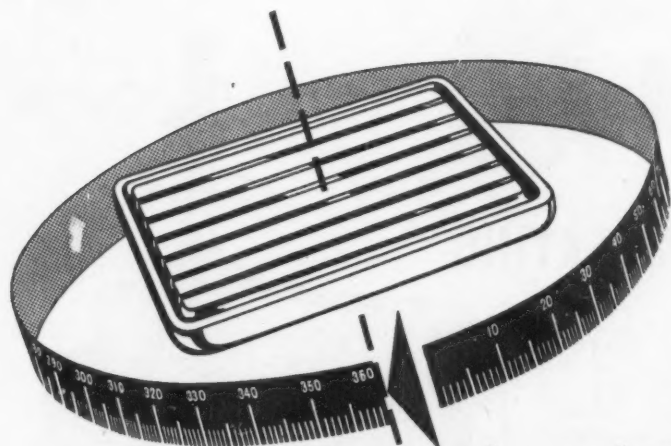
DOWDING & DOLL LTD

346 KENSINGTON HIGH STREET, LONDON, W.14

Telephone: WESTERN 8077 (8 lines)

Telegrams: ACCURATool HAMMER LONDON

When answering advertisements kindly mention MACHINERY.



360° Swivelling Table
saves Setting Time and errors

SWISS

DIXI '60'

OPTICAL PRECISION JIG BORER

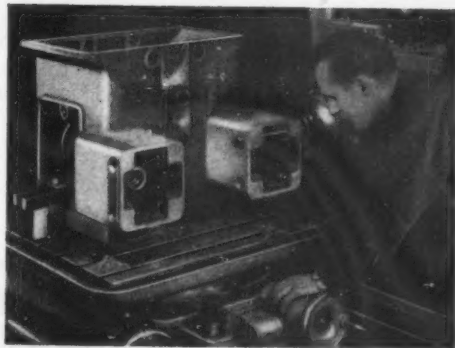
The table swivels through 360° with microscope setting to 1 min.—6 sec. can easily be estimated; the job can thus be swivelled right round and machined at any angle without disturbing the original setting. Other features include hydraulic control to the longitudinal and cross traverses, microscope setting to all traverses and additional 17½" precision optical table for mounting horizontally or vertically.

TABLE SIZE 28½" x 32½"

SPINDLE DIAMETER 2½"

SPINDLE SPEEDS 34 TO 1400 R.P.M.

Also DIXI '75', a heavier machine with 3" spindle.



Ask for illustrated catalogue

Sole U.K. Distributors.



DOWDING & DOLL LTD

346 KENSINGTON HIGH STREET, LONDON, W.14

Telephone WESTERN 8977 (8 lines)

Telegram ACCURATOL HAMMER LONDON

When answering advertisements kindly mention MACHINERY.

FRÖMAG

HYDRAULIC KEYSEATING MACHINES



Type	Keyway Width	Max. Stroke
KZ32	$\frac{1}{8}$ " - $1\frac{1}{4}$ "	$10\frac{1}{2}$ "
KZ45	$\frac{1}{8}$ " - $1\frac{3}{4}$ "	$13\frac{3}{4}$ "
KZ90	$\frac{1}{8}$ " - $3\frac{1}{2}$ "	$21\frac{1}{2}$ " - 50"
KZ125	$\frac{7}{8}$ " - 5"	59"

DISTRIBUTORS AND STOCKISTS FOR THE UNITED KINGDOM



MORTIMER ENGINEERING

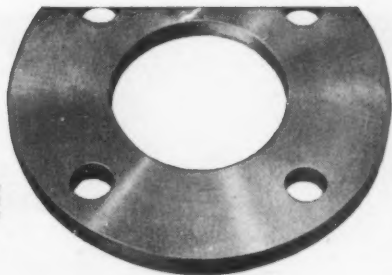
PROPRIETORS **COMPANY** S. GUITERMAN & CO. Ltd



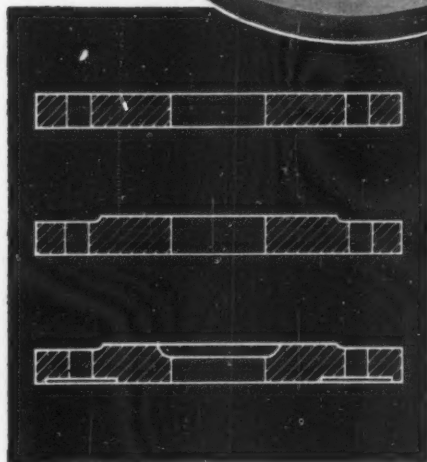
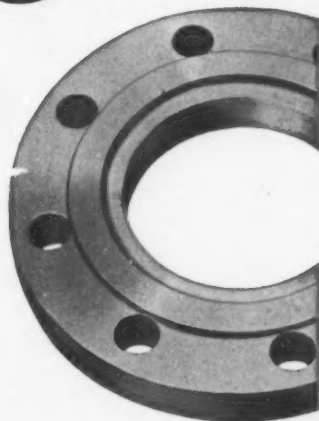
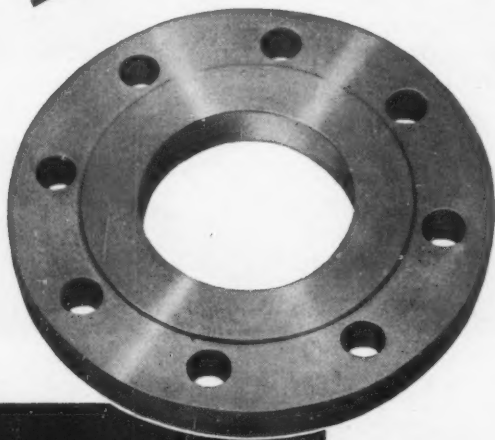
Showroom & Sales: 204/206 ACTON LANE • HARLESDEN • N.W10 • Tel: ELGAR 3834

When answering advertisements kindly mention MACHINERY.

**MILD STEEL
PLATE TYPE**



flanges

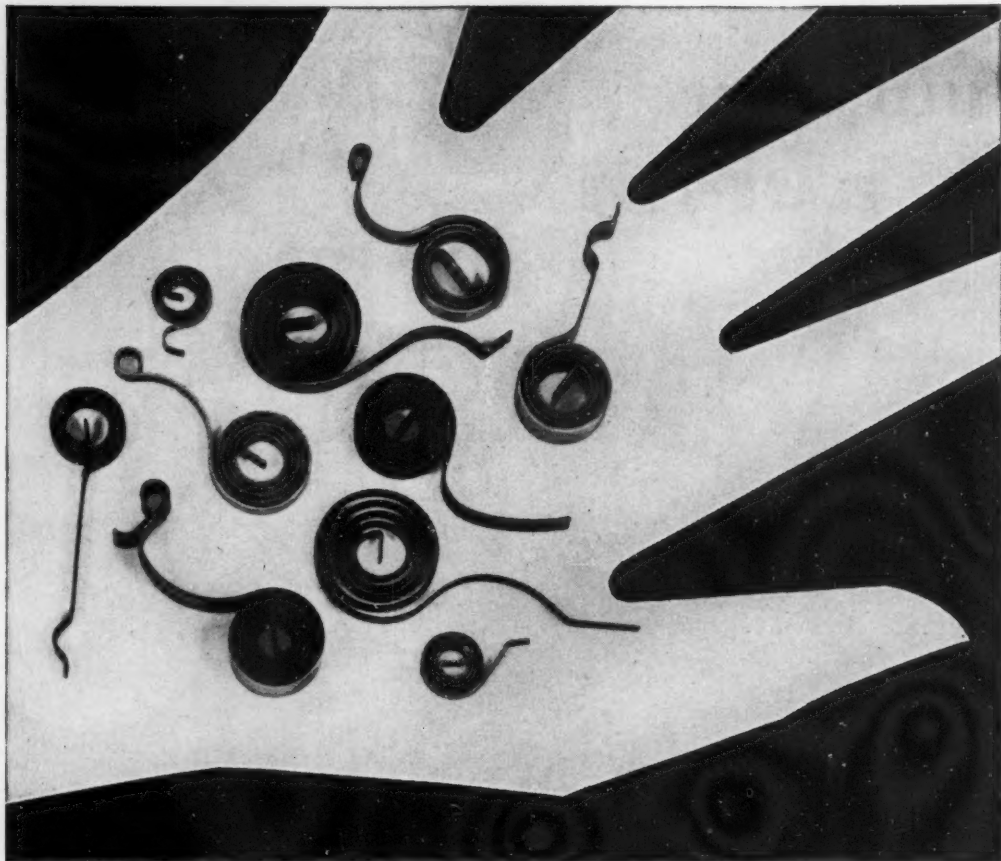


We are able to supply, from stock, a full range of Standard Plate Type Mild Steel Flanges for pressures ranging from 51 p.s.i. to 450 p.s.i. Non-standard Flanges manufactured to specification. For details of Standard dimensions write for List No. MN905.

Harvey

G. A. HARVEY & CO. (LONDON) LTD.
Woolwich Road, London, S.E.7. GREENWICH 3232 (22 lines)

When answering advertisements kindly mention MACHINERY.



BRUSH SPRINGS BY TERRYS

Our long experience has taught us how to make good BRUSH SPRINGS in steel and phosphor bronze. Please may we quote to your samples or prints?



HERBERT TERRY & SONS LTD

REDDITCH *Spring Specialists for over 103 years*

Manchester: 279 Deansgate • London: 27 Holborn Viaduct, E.C.1
Birmingham: 210 Corporation Street

HT 25A

When answering advertisements kindly mention MACHINERY.

THE

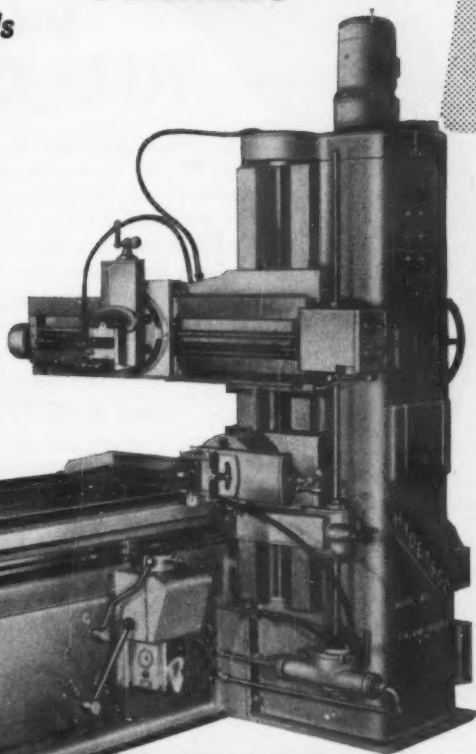
INVICTA

HYDETS CO

RANGE
OF**HYDRAULICALLY
OPERATED
PLANERS**

- ☐ ***Infinitely Variable Speeds***
(20-110 FT/MIN)
- ☐ ***Rapid Vertical Traverse***
- ☐ ***Quick Return***
- ☐ ***British Built***

Model 8H has a table working area of 27" x 72", automatic lubrication to bed ways, hydraulic automatic tool lift, centralised controls lessen operator fatigue. Rapid cross traverse to toolhead available if required.

**Model 8H. 72" Table Stroke**

Models available having 3—10ft. stroke.

MODEL 9H, 72" STROKE EX STOCK

Write for full details to:—

ELGAR

RIGHT OPPOSITE NORTH ACTON STN.

**MACHINE TOOL COMPANY LIMITED**

172-178 VICTORIA ROAD · ACTON · LONDON W3 · Telephone ACORN 5555

MIDLANDS SHOWROOM: 1075 KINGSBURY ROAD, BIRMINGHAM 24

NRP 2143

When answering advertisements kindly mention **MACHINERY**.



'QUOTE' RID-O-RUST

One COLD application removes all surface rust and combines with the rest, however deepseated, sealing off the pores of the metal with a protective phosphate plating. Simple to use—bath-dipped or brushed on—it requires no after rinse neutralising and there is no need to wipe it off. RID-O-RUST is non-toxic, non-volatile, non-inflammable—but it *is* cheap, quick and very effective. A perfect base for paint, cellulose or enamel. 'Quote' Rid-o-Rust today and end your corrosion problems.

**for RAPID RUST REMOVAL
and POSITIVE PROTECTION**

*Industrial sizes, 4, 1, 5, 10 gals. and upwards.
Also in Polypacks of 6 Fl. ozs. and 1 pt.
for testing and domestic use.*



'RID-O-RUST' is a Spectra product—
by the makers of Spectra-Color Layout and Identification
Fluids. Full details of all products gladly sent on request.

SPECTRA CHEMICALS LTD.

SPECTRA WORKS, HIGH STREET, CATERHAM, SURREY.
Tel.: Caterham 3182 & 2293. 'Grams: Spectra, Caterham.

When answering advertisements kindly mention MACHINERY.

Yate firm announces new projects

EXPANDED SCOPE AND SERVICE

West Country engineering firm opens London stockroom

Newman Industries Limited, of Yate, Bristol, have announced the opening of a new London stockroom. Situated in Monkton Street, Kennington, the building is within easy reach of Kennington and Lambeth North underground stations.

Eventually Newman will have on display at this stockroom, a representative range of the new machine tools for which they hold sole selling rights in the U.K. Meanwhile, several interesting machine tools will be moved to London, including a ROCCO horizontal borer (see adjoining column), and these may be inspected by arrangement.

The opening of this stockroom in the London area emphasises the rapid growth of the Newman Machine Tool Division over the last twelve months; in that time the Company has been granted sole selling rights in the U.K. for five continental manufacturers and achieved nationwide sales coverage through a team of skilled technical representatives. Anyone requiring fuller information should ring the Company's London Office, Sloane 8206.

Heid lathe sold overnight

A HEID Neomat centre lathe, Model VK56, with variable centre heights, price in the region of £10,000, which was the main feature of the machine tool demonstration organised by Newman in Manchester last July, has been sold to a large engineering concern. This sale was completed in 24 hours; an executive saw the machine in operation at the Company's Yate showrooms and the order number was received next morning—an excellent tribute to the performance of the machine.

Complete Rebuilding Service

Some capacity is still available for machine tool rebuilding at Yate where over 40,000 square feet is set aside for this purpose. All machine tools are rebuilt to the appropriate Schlesinger limits and guaranteed for six months. A typical detailed planning sheet showing how each rebuild is planned down to the last nut and bolt may be obtained on application to Yate.

BETTER INFORMATION SERVICE

We all suffer from a morning mail stuffed with material which often bears little relation to our business. The latest move by Newman Industries Limited to reduce this irritation will be widely welcomed by Machine Tool buyers. The Company has sent out a prepaid card on which buyers can tick classifications of new and secondhand machinery in which they may be interested. The information

**REDUCED
PRICES**

See Overleaf

ROCCO FOR NEWMAN

The Italian machine tool manufacturers ROCCO have given sole selling rights in this country to Newman Industries Limited. Announcing this from his Yate Office, Mr. J. P. Hatfield, Manager, Machine Tool Sales, said that the ROCCO Horizontal Boring and Milling Machine, a big success at this year's Milan Fair, should prove just as popular in Britain. The first machine to be imported is

STOP PRESS

MITCHELLS of Keighley have appointed Newman U.K. distributors for their range of centre lathes.

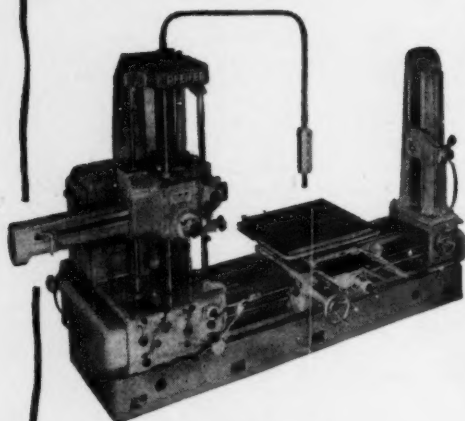
the AL76 costing about £5,000, inclusive of import duty. The AL76 has an 18in. facing head, universal milling attachment and arbor support (also used for vertical milling). Other features are high precision scales, adjustable verniers and dial indicators for vertical and horizontal traverses. The machine will be fitted with screwcutting as standard. Maximum spindle speed is 1,500. Size of indexing table 48in. by 36in. Newman confidently expect ROCCO to find a ready market in this country.

collected will enable Newman to circularise details of tools and services more quickly and more selectively than was before possible. *Buyers in future will receive only literature dealing with the classifications in which they have shown interest.*

Companies who have not received a card and are interested can get one by writing to Newman at their head office now.

New lower prices

PFEIFER



Horizontal BORING MACHINE

Suitable for long run repeat operations or short single set ups, this versatile boring machine is based on lathe design principles. The one piece well ribbed bed and heavily ribbed column ensure great rigidity. Outstanding precision is guaranteed by stringent tests with vibration instruments during manufacture.

The spindle head and traversing spindle are compact and vibration free. The gearing is hardened and ground; threads and nuts are ground for accurate adjustment and the spindle concentricity is accurate to within 0.00008 inches. Spindle size is 2½ in.

Type F60. Price £3,460.

We are now able to offer these two machines at considerably lower prices than was before possible.



Vertical Spindle SURFACE GRINDER

Available in a wide range for heavy duty precision or rough surface grinding of continuous or interrupted surfaces. During grinding the entire working width of the table can be covered simultaneously by the segmental grinding wheel. Flat and vee guides are pressure lubricated. The table is provided with slots for work clamping or the use of an electro magnetic chuck; the hydraulic traverse is infinitely variable and limited by adjustable stops. A dynamically balanced motor in the wheelhead drives the grinding spindle. The hydraulic rapid power traverse of the wheelhead is pushbutton controlled for each direction of movement and cut out travel limit switches are provided. The movement of the grinding wheel into cut is automatic and operated hydraulically or by hand at each reversal stroke of the table.

Working surface of table :

1ft. by 3ft. 4in.

1ft. by 5ft.

2ft. by 10ft.

Price £1,750

Price £1,935

Price £4,615

Sole Selling Agents U.K.



NEWMAN INDUSTRIES LIMITED

Machine Tool Division

YATE • BRISTOL • ENGLAND

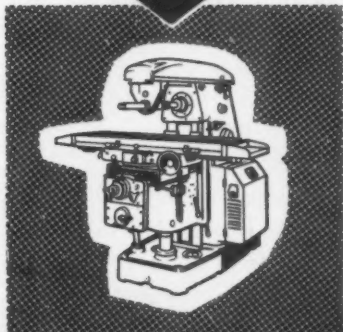
Telephone: CHIPPING SODBURY 3311

Telegrams: "DYNAMO YATE"

When answering advertisements kindly mention MACHINERY.

New single lever control

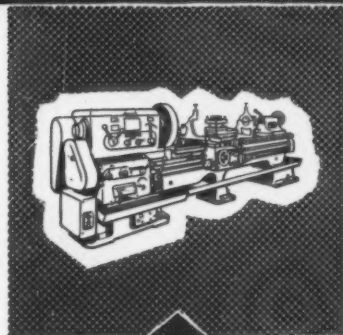
Technoimpex Universal and Vertical Milling Machines, Models UF and VF22 incorporate a unique foolproof single front lever which operates a range of twenty preselected dial speeds in geometrical progression from 19 to 1,500 r.p.m. The lever also controls the engagement of eighteen work table feeds in all directions, rapid power traverses, start, stop and instantaneous braking. The machine is specially designed for carbide tooling; the construction of knee and column ensure the greatest strength and rigidity under the highest loads. On the vertical model the main spindle is driven by hardened bevel gears of 1:1 ratio. It can be swivelled through 45 deg. and vertical traverse is provided through pilot handwheel. The table surface of these machines is 60-in. by 15-in. Price of the UF22 is £2,311, the VF22 is £2,505. Prices include motors and enclosed type panel control gear, coolant pump and standard accessories.



» TECHNOIMPEX «

A wide range of standard extras worth over £700 is included in the price of the Model MVE Centre Lathe—complete electrics including 15 h.p. driving motor, complete motor driven suds unit; fixed and travelling steadies; four-jaw face plate, dog and chuck plates; two centres and a centre sleeve; change gears; micro sliding and surfacing stops; operators lamp. Absolute vibration free running is ensured by helical gear and roller bearing spindle drive combined with well ribbed bed and rigid head construction.

The prismatic and flat bed guideways with removable gap piece are of maximum wear resistance. The headstock drive through a multi-disc reversible shock-free clutch transmits a range of 18 speeds, forward and reverse in geometrical progression of 12 to 950 r.p.m. through hardened and ground gearing on high tensile splined shafts. Sizes of the machines are from 12in. by 40in. to 14in. by 120in. Prices, including standard extras, range from £1,825 to £2,236.



Sturdy and vibration free

Sole Selling Agents U.K. for Hungarian Heavy Machine Tools (TECHNOIMPEX)

NEWMAN INDUSTRIES LIMITED

Machine Tool Division

YATE • BRISTOL • ENGLAND

Telephone: Chipping Sodbury 3311

Telegrams: "DYNAMO YATE"

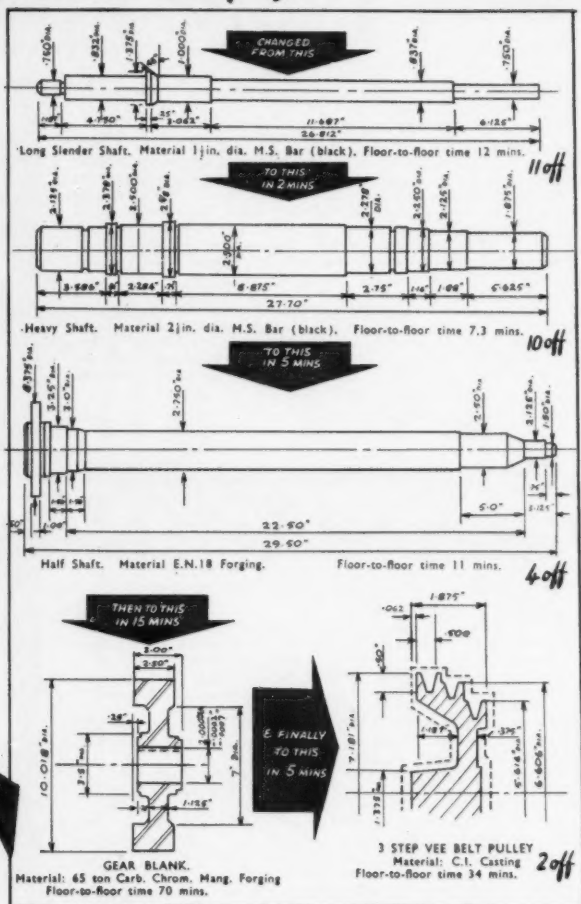


When answering advertisements kindly mention MACHINERY.

Advice on your copyturning problems

If you have any copying problems, get in touch with us. As exclusive HEID agents in the United Kingdom, we are able to prepare for you a detailed operation layout showing how HEID machines can tackle your problem and save anything up to 9/10 machining time.

Diagram showing actual floor to floor times achieved with a HEID "Sensitast" Lathe during ONE normal working day.



The HEID range, backed by over seventy years' experience in the manufacture of toolroom equipment, includes:—

- ★ COPYING LATHES with centre heights from 7½ in. to 22½ in.
- ★ COPYING EQUIPMENT for use with planers, vertical borers, turning mills, horizontal milling machines.
- ★ REVERSING DRIVE UNITS suitable for any planers, shapers and slotters.
- ★ ELECTROMAGNETIC MULTI DISC CLUTCHES suitable for any power transmission.

Sole Selling Agents U.K.

NEWMAN INDUSTRIES LIMITED

Machine Tool Division

YATE BRISTOL ENGLAND

Telephone: Chipping Sodbury 3311

Telegrams: "DYNAMO YATE"

Branches at: London (Sloane 8206) Birmingham (Northern 9634) Manchester (Deansgate 2837/8) Glasgow (Central 2101/2)

When answering advertisements kindly mention MACHINERY.





*Your
Transmission problems
positively solved
with*



POWERGRIP

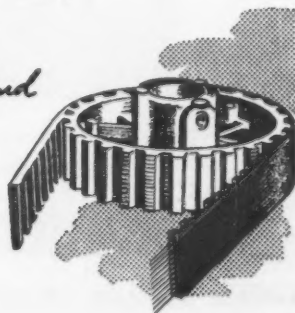
U.S. PowerGrip is a new, compact transmission medium which offers a mechanical efficiency of almost 100%, with no speed fluctuation. The non-slip, non-stretch, positive drive reduces power load and eliminates need for lubrication and tensioning devices. PowerGrip has many more advantages over other forms of power transmission; write to-day for full information.

Distributors in the United Kingdom and Northern Ireland

WILLIAM KENYON & SONS LTD

CHAPEL FIELD WORKS • DUKINFIELD • CHESHIRE

Telephone: Ashton-u-Lyne 1614/7 and 3673/6



When answering advertisements kindly mention MACHINERY.

something in the AIR

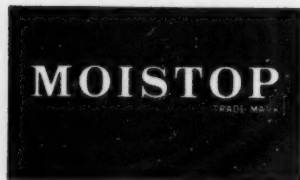
MOISTURE VAPOUR.

UNSEEN, BUT RELENTLESS IN ITS DAMAGING ACTION

MOISTOP offers an impermeable and almost untearable protection. **MOISTOP** is a **SISALKRAFT** product reinforced in two directions with unspun Sisal fibres running in the longitudinal and cross planes, these fibres being totally enclosed by two layers of high grade bitumen, which in turn are faced with tough kraft paper, and one surface is coated with a layer of **POLYTHENE**.

The result of this combination is an effective moisture vapour barrier that combines the strength of **SISALKRAFT** with the virtues of **POLYTHENE**.

*Supplied in rolls, cut sheets
and purpose made case liners*



A PRODUCT OF BRITISH SISALKRAFT LTD

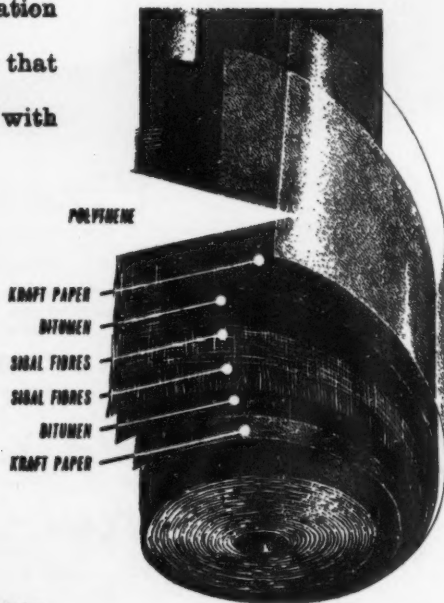
Information and samples from the

SOLE DISTRIBUTORS

J.H. SANKEY & SON LTD

Established over a Century

ESSEX WORKS · RIPPLE ROAD · BARKING · ESSEX



PHONE: DOMinion 6666

GRAMS, Brickwork Barking

When answering advertisements kindly mention MACHINERY.



ROLLS-ROYCE

use the best—
and the fastest
method of milling
LIGHT ALLOYS



Wadkin Vertical Milling Machine L.H.1. with cutting speeds up to 18,000 r.p.m. face milling a steering box. Photographs by courtesy of Rolls-Royce Ltd., Crewe.

***This steering box
is face machined
in 20 seconds!***

Rolls-Royce Ltd., like many other famous firms, appreciate the benefits of using a machine specially designed for milling Non-ferrous metals. Their Wadkin Vertical Milling Machine L.H. face mills their light alloy components, such as the steering box shown above, in a fraction of the time taken by any other method. And it does so with the accuracy and finish associated with Rolls-Royce standards. The Wadkin type L.H. consists of one basic machine of plain, robust and inexpensive design, with three alternative head arrangements. Each head has cutting speeds far higher than orthodox millers, permitting feeds as high as 84" per minute. Leaflet No. 811, giving full details will be sent on request.

Tel: Leicester 68151

Wadkin Ltd., Green Lane Works, Leicester

Wadkin

Tel: MAYfair 7048

London Office: 62-64 Brook Street, W.1

When answering advertisements kindly mention MACHINERY.

something in the AIR

MOISTURE VAPOUR.

UNSEEN, BUT RELENTLESS IN ITS DAMAGING ACTION

MOISTOP offers an impermeable and almost untearable protection. **MOISTOP** is a **SISALKRAFT** product reinforced in two directions with unspun Sisal fibres running in the longitudinal and cross planes, these fibres being totally enclosed by two layers of high grade bitumen, which in turn are faced with tough kraft paper, and one surface is coated with a layer of **POLYTHENE**.

The result of this combination is an effective moisture vapour barrier that combines the strength of **SISALKRAFT** with the virtues of **POLYTHENE**.

*Supplied in rolls, cut sheets
and purpose made case liners*



A PRODUCT OF BRITISH SISALKRAFT LTD

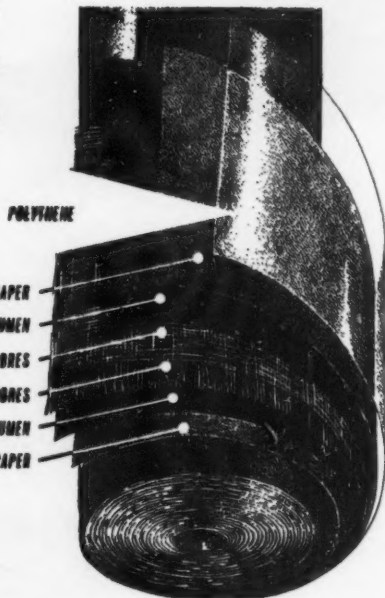
Information and samples from the

SOLE DISTRIBUTORS

J.H. SANKEY & SON LTD

Established over a Century

ESSEX WORKS · RIPPLE ROAD · BARKING · ESSEX



PHONE: DOMinion 6666

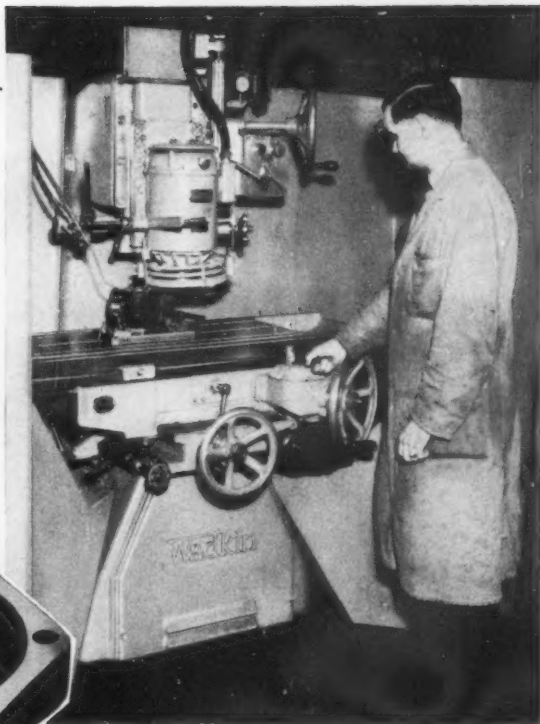
GRAMS, Brickwork Barking

When answering advertisements kindly mention MACHINERY.



ROLLS-ROYCE

use the best—
and the fastest
method of milling
LIGHT ALLOYS



Wadkin Vertical Milling Machine L.H.1. with cutting speeds up to 18,000 r.p.m. face milling a steering box. Photographs by courtesy of Rolls-Royce Ltd., Crewe.

***This steering box
is face machined
in 20 seconds!***

Rolls-Royce Ltd., like many other famous firms, appreciate the benefits of using a machine specially designed for milling Non-ferrous metals. Their Wadkin Vertical Milling Machine L.H. face mills their light alloy components, such as the steering box shown above, in a fraction of the time taken by any other method. And it does so with the accuracy and finish associated with Rolls-Royce standards. The Wadkin type L.H. consists of one basic machine of plain, robust and inexpensive design, with three alternative head arrangements. Each head has cutting speeds far higher than orthodox millers, permitting feeds as high as 84" per minute. Leaflet No. 811, giving full details will be sent on request.

Tel: Leicester 68151

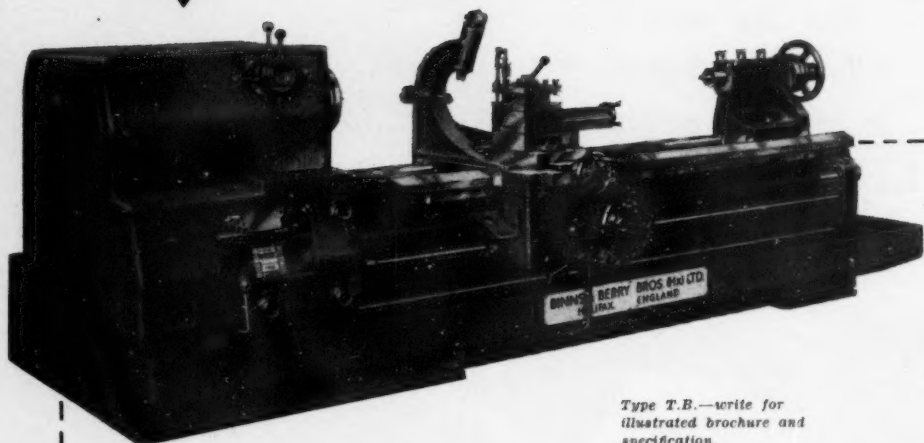
Wadkin Ltd., Green Lane Works, Leicester

Wadkin

Tel: MAYfair 7048

London Office: 62-64 Brook Street, W.1

When answering advertisements kindly mention MACHINERY.

12½"**CENTRE LATHE***Wide Capacity*

Type T.B.—write for
illustrated brochure and
specification.

High Speed

- ★ 16 spindle speeds from 12 to 600 r.p.m.
- ★ Independent electric power traverse to saddle and tailstock.
- ★ Spindle admits 4in. diameter bars.
- ★ 15 h.p. main drive motor.
- ★ 60 change feed and screw-cutting gearbox.
- ★ Sliding feeds from 0.002in. to 0.154in. per rev.
- ★ Threads from 1-56 T.P.I.
- ★ Surfacing feeds from 0.001in. to 0.100in. per rev.
- ★ Deep tray and electric suds pump.
- ★ Gap capacity 43in. diameter.
- ★ Diagonally braced bed with chilled sloping angle slideways.
- ★ Longer beds to 22ft. and full range of accessories available.
- ★ Machine delivered fully wired, piped and complete with fuses.

You are cordially invited to visit our works at Brighouse, Yorkshire,
to view these machines during construction and under test.

BINNS & BERRY BROS (HALIFAX) LTD
OVENDEN • HALIFAX • ENGLAND

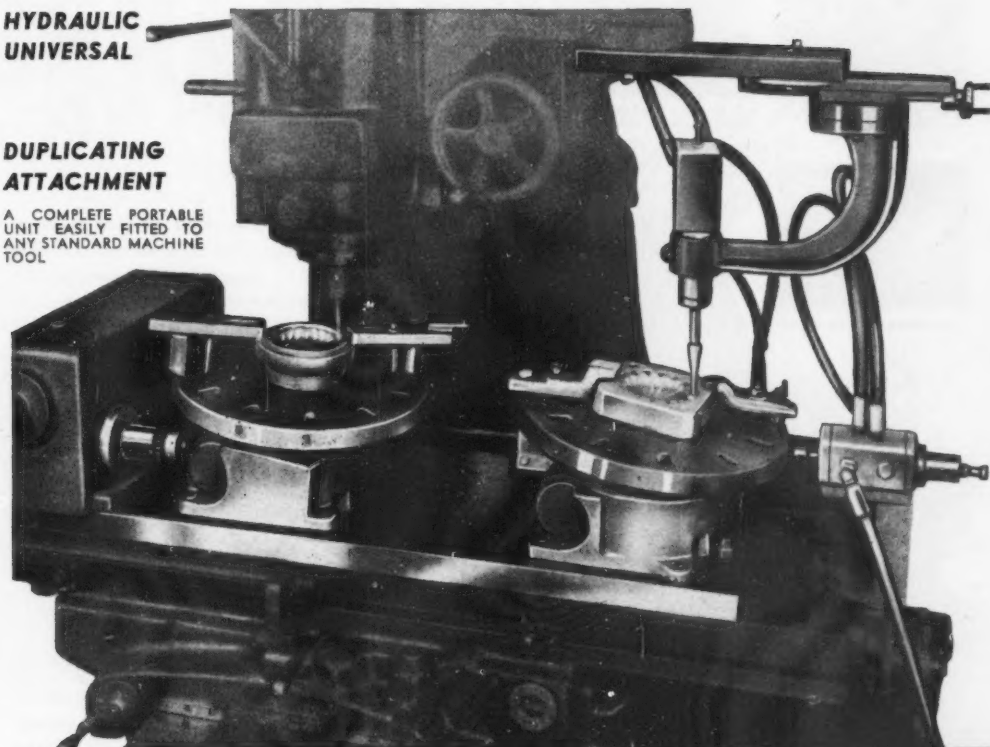
Telephone: Halifax 60231/2/3.

Telegrams: Borer, Halifax

When answering advertisements kindly mention MACHINERY.

**HYDRAULIC
UNIVERSAL****DUPLICATING
ATTACHMENT**

A COMPLETE PORTABLE
UNIT EASILY FITTED TO
ANY STANDARD MACHINE
TOOL



The features illustrated above are the subject
matter of one or more of several patents.

The **HYPROFILE**

The 'Hyprofile' Rotary Table Copy Milling
Equipment fitted to a standard Milling Machine and
producing Steel Dies from Plaster Masters fully
automatic in operation.

'Hyprofile' Equipment is available for a wide
variety of Automatic Milling work from three-
dimensional Masters or two-dimensional Profiling.

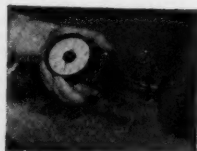
Descriptive Catalogue supplied on application

Can be fitted to
Centre Lathes
Vertical Borers
Shaping Machines
Planing Machines
Vertical & Horizontal
Milling Machines
for profiling & three-
dimensional milling

PROVED ON PRODUCTION

ARMYTAGE (TOOLS) LTD FOUNDRY LANE - KNOTTINGLEY - YORKS - ENG.
TELEPHONE 2743/4

When answering advertisements kindly mention MACHINERY.



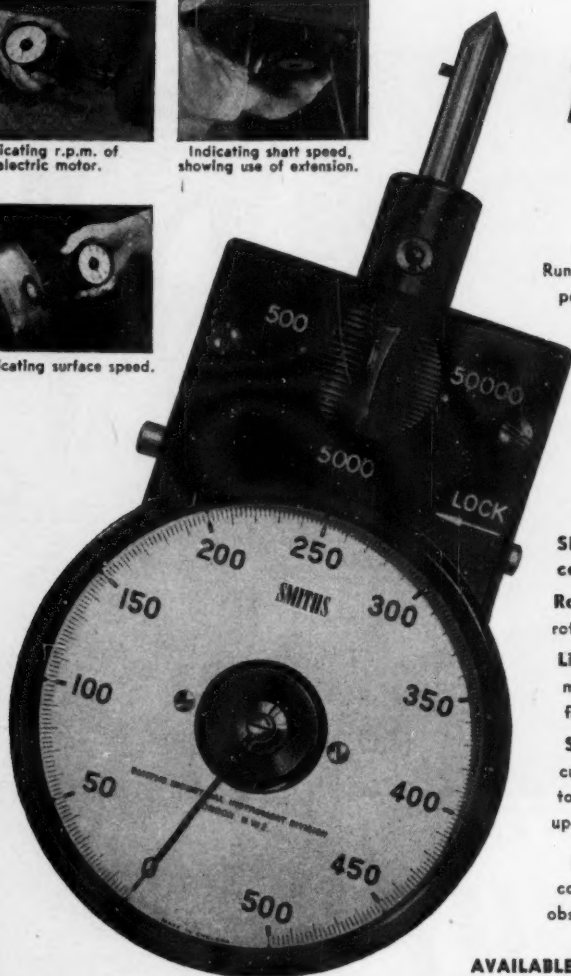
Indicating r.p.m. of electric motor.



Indicating shaft speed, showing use of extension.



Indicating surface speed.



The Right REVS

Run your machinery at the optimum speed for peak efficiency. Any deviation from this speed almost certainly means that it—and you!—are running at a loss.

Cut this loss by making spot checks of r.p.m. with a SMITHS Hand Tachometer. Such a check can be made in an instant, even in unfavourable conditions. What's more, the reading is accurate to within $\frac{1}{2}\%$.

SMITHS HAND TACHOMETERS can be used for checking:—

Rotational speeds of shafts, spindles, gears, rotors and rolls.

Linear speeds in ft/min or metres/min of metal strips, textiles, paper, wire, plastic, film and conveyed material.

Surface speeds in ft/min or metres/min of cutting or grinding operations of machine tools, processing rolls, unwind rolls or wind up rolls for extrusion and strip production.

Readings can be taken in bad lighting conditions or where the dial is visually obscured.

AVAILABLE IN CHOICE OF FOUR MODELS:—

Model A.T.H. 4 (0-50,000 r.p.m.) Illustrated

Model A.T.H. 6 (0-10,000 r.p.m.)

Model A.T.H. 7 (0-20,000 r.p.m.)

Model A.T.H. 10 (0-5,000 r.p.m.)

ALL FOR L.H. OR R.H. DIRECTION OF ROTATION

PRICE (complete with strong case and full range of accessories)

£14.14.0

postage and packing extra.

**POST
THIS
FOR
FULL
DETAILS**

Please send full details of your
HAND TACHOMETERS

NAME

ADDRESS

.....

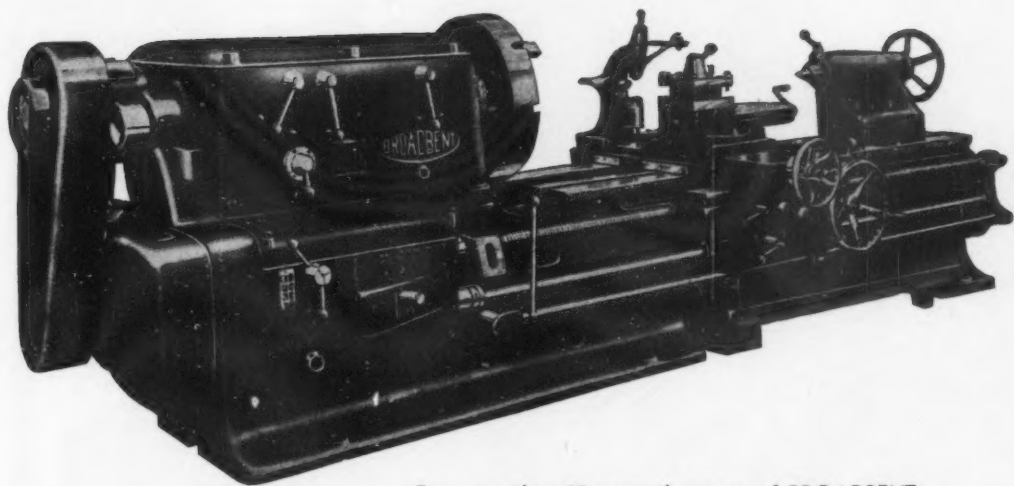
SMITHS

INDUSTRIAL INSTRUMENT DIVISION

Chronos Works, North Circular Road, London, N.W.2. Telephone: GLAdstone 1136

When answering advertisements kindly mention **MACHINERY**.

BROADBENT

Lathes

For more than 80 years the name of BROADBENT has been synonymous with high quality centre lathes. The accumulated knowledge and experience of lathe manufacture gained during that time is reflected in the design and performance of present-day machines.

In addition to standard Centre Lathes from 8½" to 24" height of centres, we also specialise in Surfacing and Boring Lathes, Break Lathes, Heavy Duty Horizontal Plano-Milling Machines and Vertical Boring and Turning Mills.

8½" to 18" lathes can be offered with good delivery.

Write or telephone for full details.



HENRY BROADBENT LIMITED

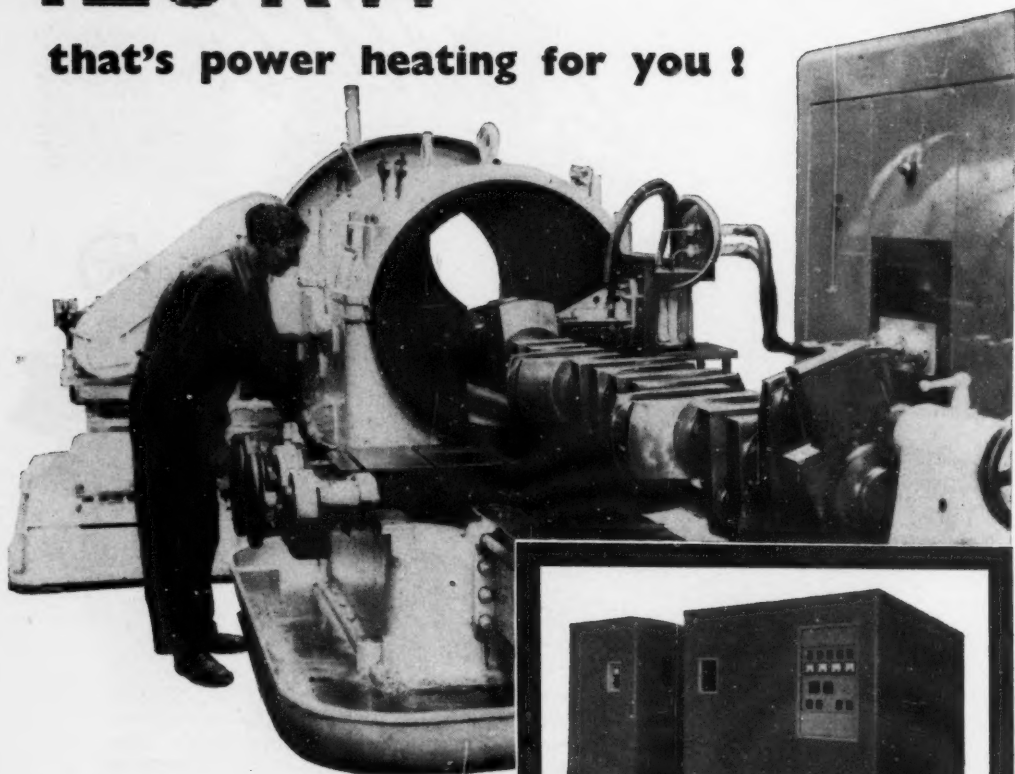
SOWERBY BRIDGE, YORKS.

Telephone: HALIFAX 81331

A Kerry Company

125 kW

that's power heating for you !



The most powerful air-cooled induction heater in the world, yet the Redifon IH. 45 is remarkably simple to operate. By rapid, selective heat treatment, overcoming distortion problems, the IH. 45 will carry out a wide variety of heating processes. Speed of production is greatly increased; processing time reduced to a fraction of that needed by other methods. This heater provides 7000 B.Th.U. of process heat per minute, with a power output—continuously variable from 3 kW to 125 kW—operated from a single control. Compactly designed to fit into the factory layout, the IH. 45 will give reliable, continuous service under the most arduous conditions.

The illustration shows a large marine crankshaft which Mitchell-Shackleton & Co. Ltd. are heat-treating for one of their customers.

***Redifon* IH 45**

REDIFON LIMITED Industrial Electronics Division, Broomhill Road, London S.W.18
Telephone: VANDyke 7281

A Manufacturing Company in the Rediffusion Group.

108R

When answering advertisements kindly mention MACHINERY.

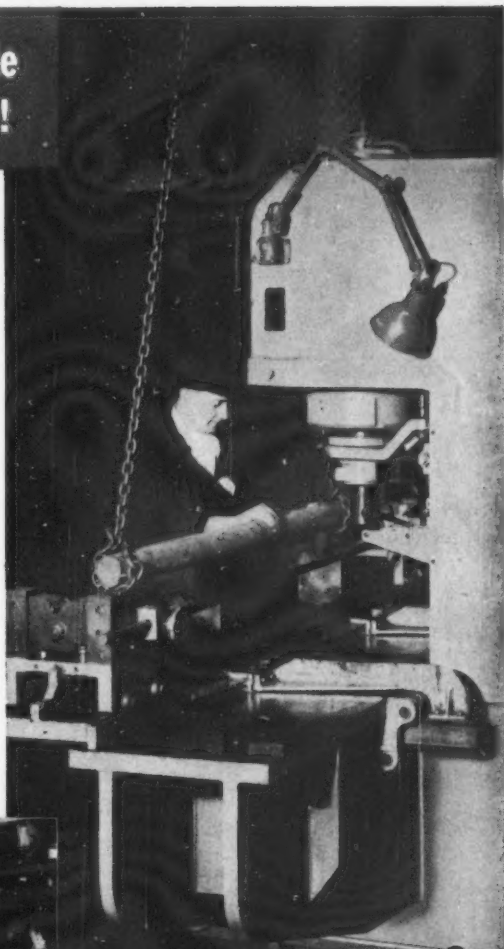
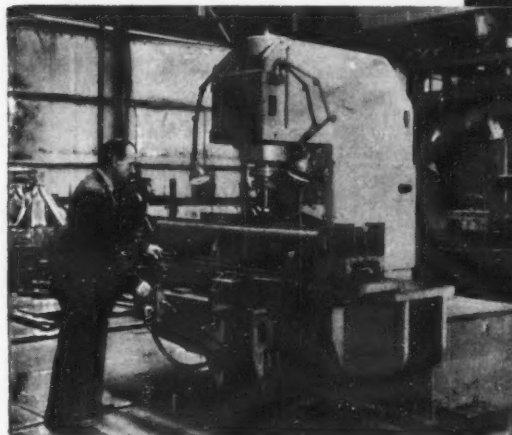
Load and unload outside the throat of the Press!

This 75-ton Hi-Ton Straightening Press incorporates a hydraulic traversing table for loading and unloading outside the throat area of the machine.

The illustration opposite shows the table in its forward position, and loading is simplified and speeded up with a minimised risk of damage to the machine by heavy bars and lifting tackle.

The lower illustration shows a bar in position ready for straightening and the operator is depressing the lever to actuate the hydraulic return of the table to its rear position with the component beneath the ram.

Write today for details of this type of Straightening Press and mention the capacity which interests you.



HI-TON

STRAIGHTENING PRESS

Sales & Service for ...

DRUMMOND-ASQUITH

... the British Isles

DRUMMOND-ASQUITH (SALES) LTD., KING EDWARD HOUSE, NEW ST., BIRMINGHAM

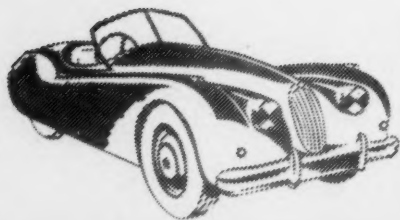
'Phone: Midland 3431 (7 lines) 'Grams: Maxishope, B'ham.

Also at LONDON: Phone: Trafalgar 7224 (5 lines) and GLASGOW: 'Phone: Central 0922

When answering advertisements kindly mention MACHINERY.

HF 216

D



GRINDING 'JAGUAR' CRANKSHAFTS



The
PRECIMAX
Way

**FOR
CONSISTENTLY HIGH
RATES OF PRODUCTION**

These PRECIMAX™ MPB 14/40 Plain Cylindrical Grinding Machines yield the twin merits of consistently high output and unvarying accuracy which contribute valuably to the economical production of Jaguar crankshafts. They are equipped with 36in. diameter grinding wheels for grinding the main journal bearing diameters and the machining cycle includes automatic facing feed for grinding the journal end faces.

LANDIS LUND LIMITED

EASTBURN WORKS · CROSS HILLS · Nr. KEIGHLEY · ENGLAND

Telegrams: Grinding, Crosshills. Telephone: Cross Hills 3211-2-3

When answering advertisements kindly mention MACHINERY.

YOU'LL BE MUCH BETTER OFF WITH A HARRISON

Built to a standard above its price
— your Harrison 11" swing lathe
will be giving you accurate service
for more years than you expected.

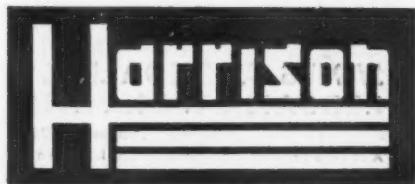
SPECIFICATION

Swing over bed 11"
Swing in gap 18"
Between centres 24" or 40"
8 or 16 spindle speeds

11" SWING

£370.0.0

With inbuilt hydraulic copying equipment
£700.0.0



SEND FOR FULLY DETAILED
LEAFLET TODAY

T. S. HARRISON & SONS LIMITED • HECKMONDWIKE • YORKSHIRE

When answering advertisements kindly mention MACHINERY.

ARCHDALE

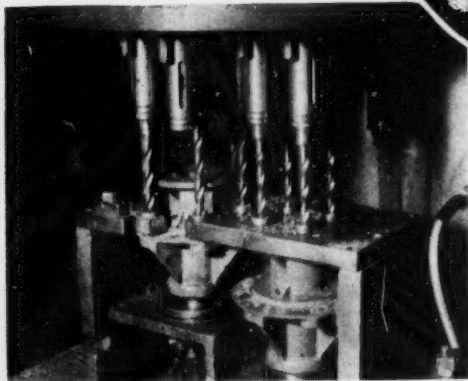
Multiples..

SPEED PRODUCTION AT INTERNATIONAL HARVESTER

With hydraulic feed and sliding head, these are the machines to slash costs where multi-drilling on batch production is involved. At International Harvester Co. (Gt. Britain) Ltd., Doncaster, for instance, six $\frac{11}{16}$ in. and four $\frac{1}{2}$ in. diameter holes are drilled in hubs for baling machines at the rate of 55 hubs per hour.

These machines can be supplied with circular or rectangular heads, with up to twelve adjustable spindles with a capacity, according to size of machine, for drilling holes from $\frac{3}{8}$ in. to $1\frac{1}{4}$ in. dia. Machines with fewer spindles naturally have a greater capacity.

Ask for complete details and production data on your own work.



**JAMES ARCHDALE & CO. LTD.
LEDSAM ST. BIRMINGHAM. 16.**

Telephone No. EDGaston 2276

A Member of the Staveley Coal & Iron Co., Ltd., Group

Sole Agents: ALFRED HERBERT LTD. COVENTRY

Telephone No. 89221

When answering advertisements kindly mention MACHINERY.



Do you remember the test conducted recently where users were given a New Clarkson Truesize Reamer to test and asked to report on the results?

Clarkson New Truesize Reamers were tried under actual working conditions and the results show users to be overwhelmingly in favour of this new system.

Here are a few typical reports from satisfied users:—

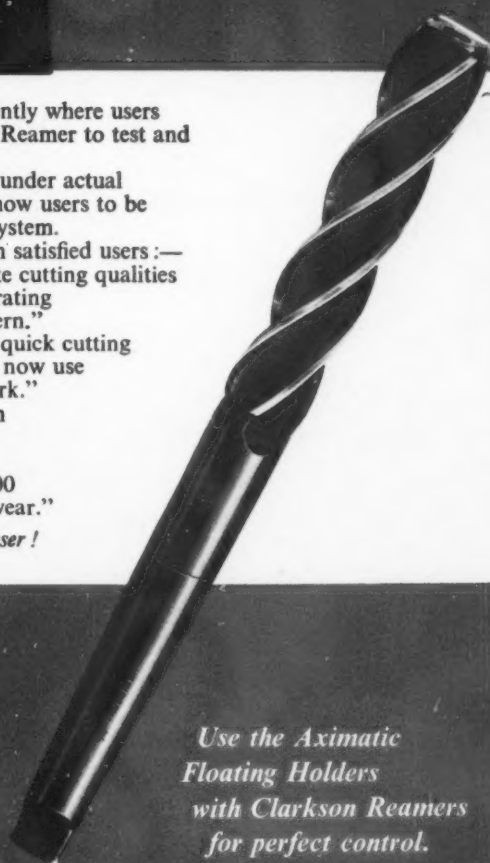
"We are very pleased with the definite cutting qualities of your reamer as opposed to the heat generating characteristics of the more normal pattern."

"Your reamers are excellent. They give a quick cutting action with a perfect finish. We shall now use this type of reamer only for all our bore work."

"Your reamer has everything you claim for it, and we are very pleased with its great accuracy."

"Dead size. Very good finish on 200 aluminium castings with no sign of wear."

Try them yourself—and be another satisfied user!



Clarkson

TrueSize

REAMERS

*Use the Aximatic
Floating Holders
with Clarkson Reamers
for perfect control.*

CLARKSON (ENGINEERS) LTD. Head Office: Nuneaton. Phone: Nuneaton 2261
NEWCASTLE 261 Westgate Rd., 1 NEWCASTLE 2-5245 BRISTOL 17 Cumberland St., 1 Bristol 2-5464
BIRMINGHAM 15 Heath Mill Lane, 9 VICtoria 3996 BELFAST 22 Shaftesbury Square Belfast 28623
LONDON 124 Hammersmith Rd., W.4 RIVERSide 124 GLASGOW 430 Crown St., C.3 SOUTH 19-1
MANCHESTER 19 Oxford Road, 13 ARDwick 4304 LEEDS Noan St, Britannia House, 1 Leeds 2-3075

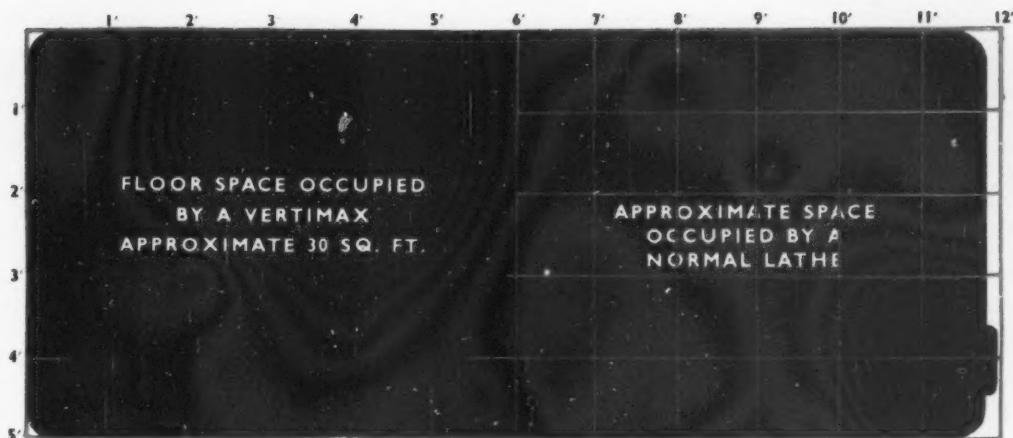
When answering advertisements kindly mention MACHINERY.



Angus
GEARS

**GEARS AND
GEAR UNITS OF
ALL KINDS**

GEORGE ANGUS & CO. LTD.
GEAR DIVISION · HEBBURN ON TYNE · PHONE: HEBBURN 832204



FOR PRODUCTION PER SQ. FT.



The VERTIMAX Vertical Spindle Production Lathe takes little floor space for the range and capacity of work of which it is capable. In fact it takes literally half the space of a comparable horizontal lathe. Also, its exterior is smooth and free from projections.

The VERTIMAX is extremely simple to set up and load. Its features include an air operated chuck and spindle brake, two independent and adjustable tool slides which can be swung through any angle, infinitely variable hydraulic feed, automatic operation and grouped controls.

For a brochure giving full details of the VERTIMAX production lathe, No. 2—21" swing, No. 3a—24" swing, No. 3—24" swing, write to:—



CHARLES CHURCHILL AND COMPANY LIMITED

COVENTRY ROAD, SOUTH YARDLEY, BIRMINGHAM, 25.

BRANCHES: LONDON • GLASGOW • NEWCASTLE • MANCHESTER

When answering advertisements kindly mention MACHINERY.



**made precisely
for
instrument making**

AND SIMILAR PRECISION WORK

Individually built to permit working to the closest tolerances, the Boxford $4\frac{1}{2}$ in. Precision Plain lathe has comparator gauges incorporated on the slides to maintain identical repeats. This is an exceptionally reliable and robust lathe.

Admits 17in. between centres. $\frac{1}{4}$ h.p. motor with infinitely variable speeds from 220 to 2000 r.p.m.

Special compound rest slide with fiducial indicators and slip gauge platforms supplied at extra cost or in lieu of standard rest.

Range of special equipment available

£340 . 0 . 0



Box-Ford

$4\frac{1}{2}$ in. PRECISION PLAIN LATHE

Send for fully detailed leaflet TODAY

DENFORDS ENGINEERING CO. LTD., HECKMONDWIKE YORKSHIRE

When answering advertisements kindly mention MACHINERY.



—but for fractional horse-power in industry...

the sturdy 'ENGLISH ELECTRIC' f.h.p. motors can be harnessed to do all manner of work efficiently and economically. From 1/20th horse-power upwards there is a model exactly suited to any particular load under any local conditions.

Details of the full range will be sent on request



'ENGLISH ELECTRIC'

f.h.p. motors

THE ENGLISH ELECTRIC COMPANY LIMITED, MARCONI HOUSE, STRAND, LONDON, W.C.2

F.H.P. Motors Department, Bradford

WORKS: STAFFORD • PRESTON • RUGBY • BRADFORD • LIVERPOOL • ACCRINGTON
FHP. 39F7

When answering advertisements kindly mention MACHINERY.



Individually built to permit working to the closest tolerances, the Boxford $4\frac{1}{2}$ in. Precision Plain lathe has comparator gauges incorporated on the slides to maintain identical repeats. This is an exceptionally reliable and robust lathe.

Admits 17in. between centres. $\frac{1}{2}$ h.p. motor with infinitely variable speeds from 220 to 2000 r.p.m.

Special compound rest slide with fiducial indicators and slip gauge platforms supplied at extra cost or in lieu of standard rest.

Range of special equipment available

£340 . 0 . 0



Box-Ford

$4\frac{1}{2}$ in. PRECISION PLAIN LATHE

Send for fully detailed leaflet TODAY

DENFORDS ENGINEERING CO. LTD., HECKMONDWIKE YORKSHIRE

When answering advertisements kindly mention MACHINERY.



—but for fractional horse-power in industry...

the sturdy 'ENGLISH ELECTRIC' f.h.p. motors can be harnessed to do all manner of work efficiently and economically. From 1/20th horse-power upwards there is a model exactly suited to any particular load under any local conditions.

Details of the full range will be sent on request



'ENGLISH ELECTRIC'

f.h.p. motors

THE ENGLISH ELECTRIC COMPANY LIMITED, MARCONI HOUSE, STRAND, LONDON, W.C.2
F.H.P. Motors Department, Bradford

WORKS: STAFFORD • PRESTON • RUGBY • BRADFORD • LIVERPOOL • ACCRINGTON
FHP. 39F7

When answering advertisements kindly mention MACHINERY.



SEEGER CIRCLIPS
are **360° safe**

Automotive Engineering Limited



One of the Sheepbridge Engineering Group
The Green, Twickenham, Middlesex.
Telephone: Popesgrove 2206/9
Telegrams: Motif, Twickenham

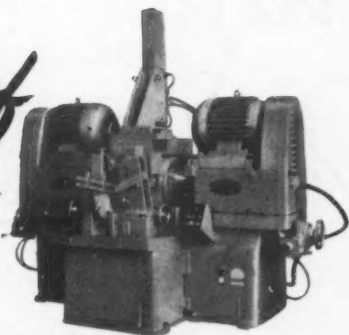
When answering advertisements kindly mention MACHINERY.

*The fastest method of
grinding two surfaces
simultaneously!*

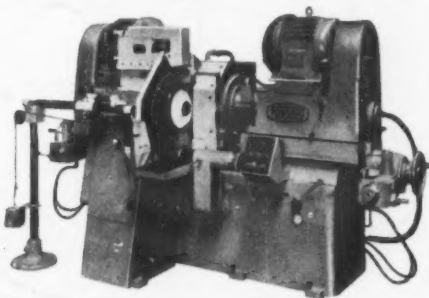
ROWLAND

DUPLIX SURFACE GRINDERS

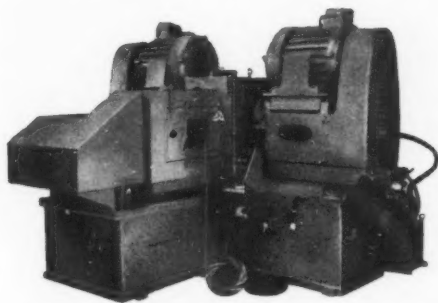
* Illustrated here are but a few of the very many types of 'Duplex' surface grinding machines that we manufacture.



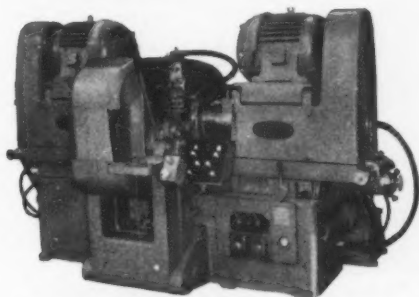
30in. Type ADD/F



20in. Type HDD/C



30in. Type ADD/H



30in. Type ADD/O

* All machines are capable of extremely impressive rates of production, coupled with high degrees of accuracy and surface finish.
Our technical representatives are ready, able and willing to co-operate with you.

**F.E. ROWLAND
& CO. LTD.**

Telephone:
HEATON MOOR
3201-2-3
Telegrams
HEROIC, REDDISH

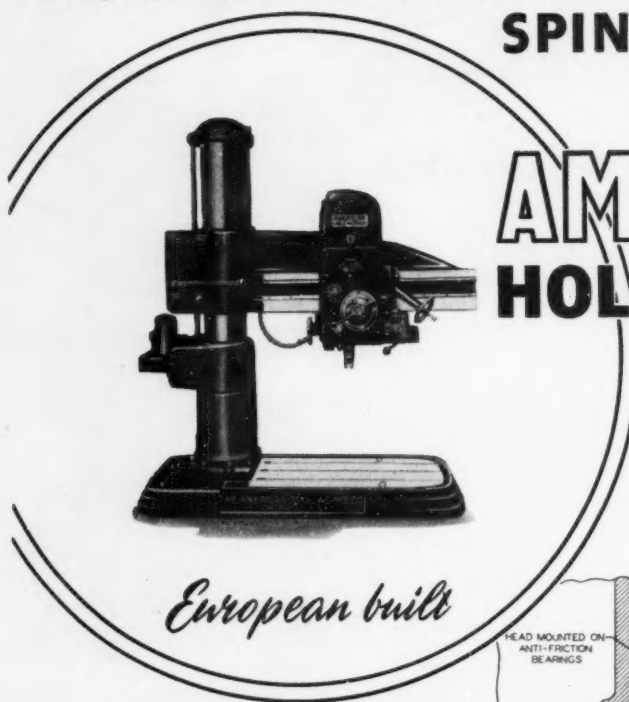
REDDISH • STOCKPORT • ENGLAND

Sole Export Agents: DRUMMOND ASQUITH (Sales) LTD., Halifax House, Strand, London, W.C.2. Tel: TRAlgar 7224

When answering advertisements kindly mention MACHINERY.

The radial with the **NITRIDED-STEEL SPINDLE AND SLEEVE**

The **AMERICAN HOLE WIZARD**



European built

The construction of spindle assembly is an outstanding achievement. The spindle is made of nitrided steel for extreme surface hardness—lap-ground for utmost precision. Spindle sleeve is also of nitrided steel, honed to size and mounted in precision Timken roller bearings.

- Twelve speed head with built-in motor drive with motor mounted on head and directly coupled to initial driving shaft.
- Electric Column Clamp operated from head.
- Combined Elevating and Arm Clamping mechanism through single lever control.
- Electrical reverse for tapping.
- Six Geared Feeds.
- Three Optional ranges of 12 direct reading spindle speeds.
- Nitrided spindle and spindle sleeve—anti-friction mounted.
- Lo-Hung Spindle Drive.

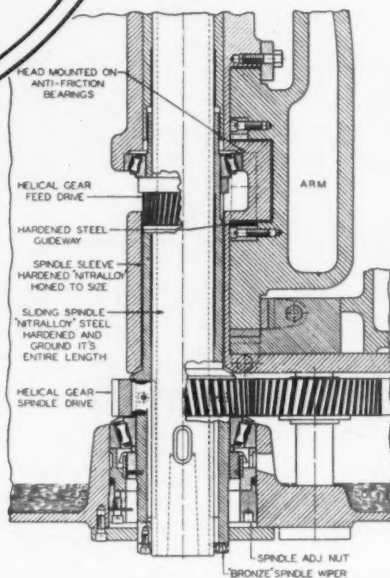


Diagram of spindle assembly.



Spindle unit showing integral feed rack, helical gear drive and adjustable Timken roller bearing mounting.

Sole Agents in the British Isles for American Tool Works.

BUCK & HICKMAN LIMITED

Machine Tools: OTTERSPOOL WAY, WATFORD BY-PASS, HERTS.
 Head Office: 2-8 WHITECHAPEL ROAD, LONDON, E.1.
 Branches: ALPERTON · BIRMINGHAM · GLASGOW · LEEDS · MANCHESTER

Introducing the **SYNTRON EB.00**



The EB.00 is the newest and smallest feeder in the Syntron Bowl Feeder range, being only 6 in. in diameter and 6½ in. high. It is supplied with a quick release bowl, clockwise or anti-clockwise discharge and easy-to-operate controller. This compact unit and the other Syntron Bowl Feeders in the range provide the orientated feeding of small parts one at a time.

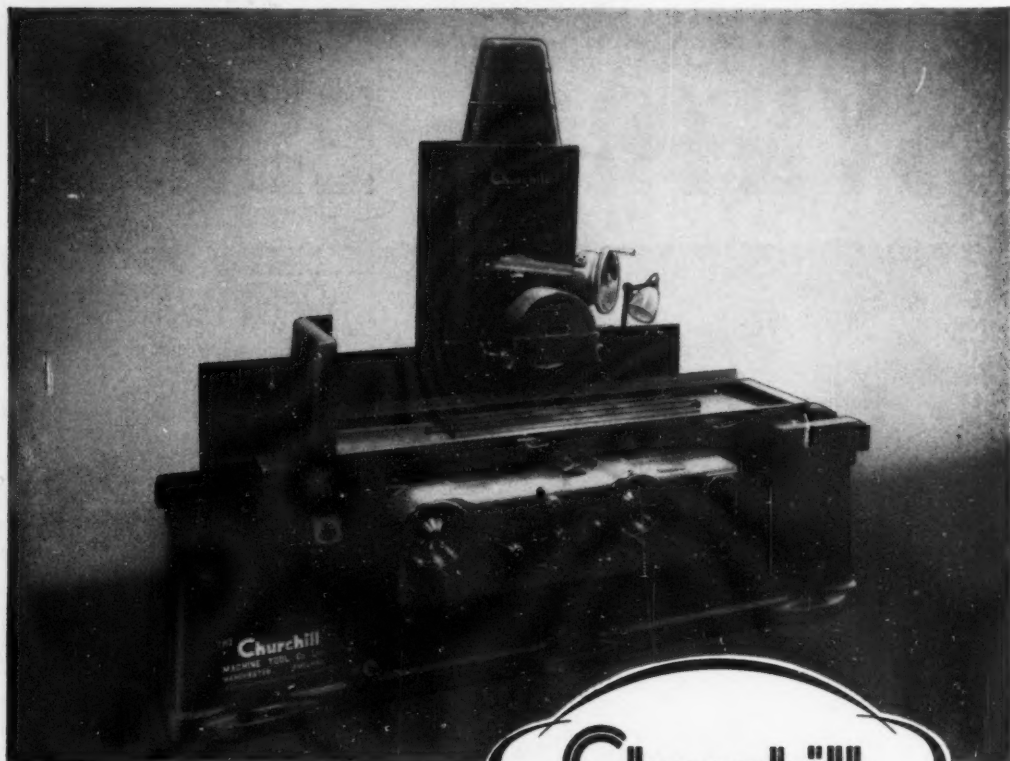
SYNTRON *KEEPS THINGS MOVING*

FULL DETAILS AVAILABLE ON REQUEST

RILEY (IC) PRODUCTS LIMITED - ONE OF THE INTERNATIONAL COMBUSTION GROUP OF COMPANIES
NINETEEN WOBURN PLACE, LONDON, W.C.1. TELEPHONE: TERMINUS 2622

TGA 569

When answering advertisements kindly mention MACHINERY



Churchill

'OSB'

HORIZONTAL SPINDLE SURFACE GRINDING MACHINE

This machine is designed for work requiring extremely accurate and highly finished flat surfaces. Besides being ideal for toolroom work and for die grinding, the Model 'OSB' can be used to advantage in the production line. High rates of output are obtainable. Built in three sizes with work tables 30in. by 10in., 42in. by 10in. and 60in. by 10in.

Easy and simple operation.

Built-in motor drive to grinding wheel spindle. Motorised automatic pump lubricating system and simple bearing assembly give a high precision spindle capable of heavy grinding cuts.

Variable hydraulic cross feed to wheel. Pre-set automatic cut-out and automatic reverse.

Fine and coarse vertical feed.

Massive cross slide underneath wheelhead column gives large area of support and maximum stability.

Hydraulic table traverse up to 90 feet per minute. Hand traverse interlocked with hydraulic control.

Permanently protected precision ground table slideways.

Table traverse ways, wheelhead cross slideway and cross feed gears and bearings automatically lubricated from oil supply independent of hydraulic system.



THE CHURCHILL MACHINE TOOL CO. LTD. BROADHEATH, NR. MANCHESTER

Telephone: Altrincham 3262.

Export Sales Organisation:

Home Selling Agents:

Telegrams: Churchale, Manchester

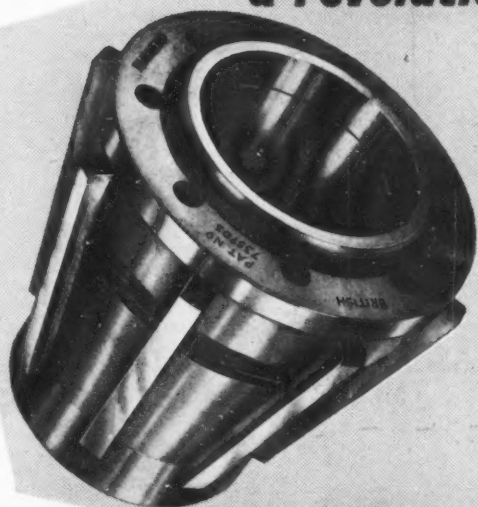
ASSOCIATED BRITISH MACHINE TOOL MAKERS LTD.
LONDON, BRANCHES AND AGENTS

CHARLES CHURCHILL & CO. LTD., BIRMINGHAM AND BRANCHES

PRECISION *plus* PRODUCTION

BURNERD "PRECISION" multisize collet

a revolutionary NEW workholder

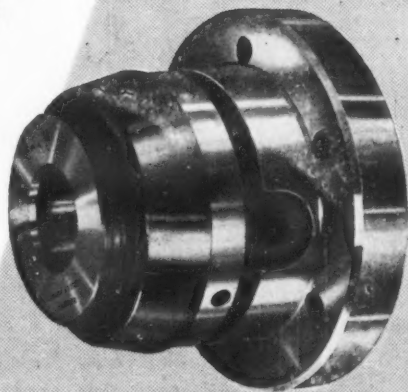


SUPERLATIVE ACCURACY • GRIP • RIGIDITY

This startling new workholder provides all the advantages of conventional spring collets combined with the flexibility of an adjustable jaw chuck. One "Multisize Collet" will replace at least 9 conventional collets and only 11 collets are required to cover a range of $\frac{1}{8}$ " to $1\frac{1}{2}$ ". Several years of research and testing lie behind the "Multisize Collet". Write today for fully illustrated brochure.

TEN FEATURES OF THE COLLET

- ▶ **Powerful grip—MANY TIMES GREATER THAN SPRING COLLETS.**
- ▶ **Greater accuracy than ever before achieved with collets.**
- ▶ **Grips and locates without distortion of collet.**
- ▶ **Each collet covers $\frac{1}{4}$ " range of capacity.**
- ▶ **Only eleven collets required to hold any diameter bar between $\frac{1}{8}$ " and $1\frac{1}{2}$ " whether English, metric or decimal sizes.**
- ▶ **Positive grip maintained under load.**
- ▶ **No difficulty with under and oversize components.**
- ▶ **Maximum feeds and speeds obtainable without risk of slipping and scoring or distortion of components.**
- ▶ **Constant parallel grip throughout complete range of collet.**
- ▶ **Thin walled components gripped firmly without damage.**



**THE NEW
BURNERD
COLLET
CHUCK**

Designed specifically for Burnerd "Multisize Collets", the new Burnerd Collet Chuck provides an extremely powerful and accurate closing mechanism for the Collets. Capacity $\frac{1}{8}$ " to $1\frac{1}{2}$ " diameter.



F. BURNERD & COMPANY LIMITED

5, Balfour Place, Park Lane, London W.1.

Telephone: GROsvenor 4741/3 • Telegrams: BURCHUCKS AUDLEY LONDON • Cables: BURCHUCKS LONDON



The
MICROBALL
HEIGHT GAUGE &
BALL COMPARATOR
MADE TO MEASURE

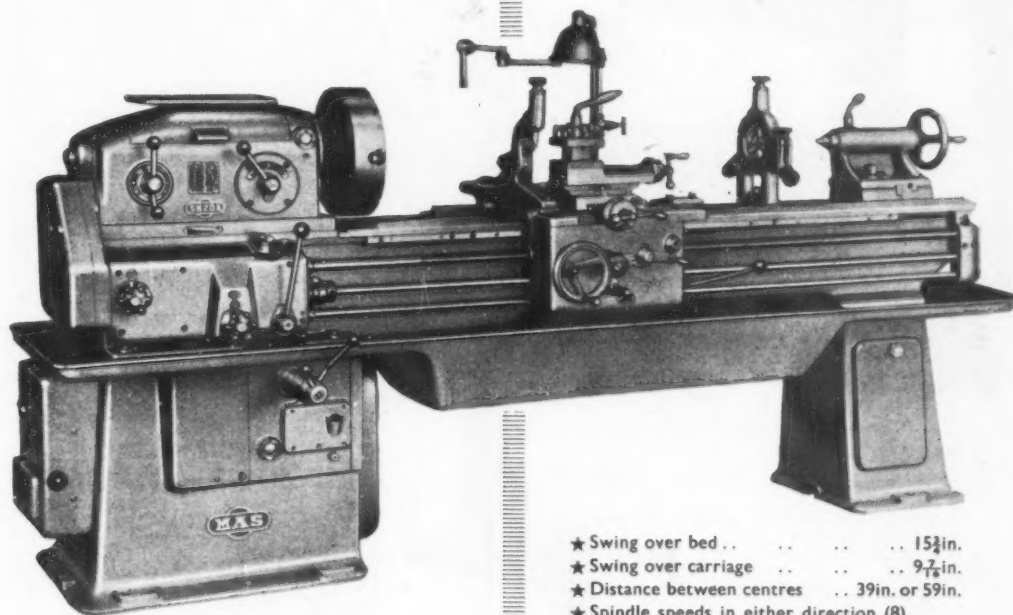
12" UNIT
£26
 24" UNIT
£60
 INDICATORS EXTRA

FOR ENQUIRIES WRITE—SEND FOR ILLUSTRATED LITERATURE
 MICROBALL ENGINEERING LTD., KING ROAD, BIRMINGHAM, ENGLAND. CABLES: 20-1-48 1972

When answering advertisements kindly mention MACHINERY.



PRECISION LATHE SN 20a



IMMEDIATE DELIVERY

EXCLUSIVE DISTRIBUTORS IN
THE UNITED KINGDOM

ELGAR

MACHINE TOOL COMPANY LIMITED

RIGHT OPPOSITE NORTH ACTON STN.

172-178 VICTORIA ROAD · ACTON · LONDON W3 · Telephone ACORN 5555

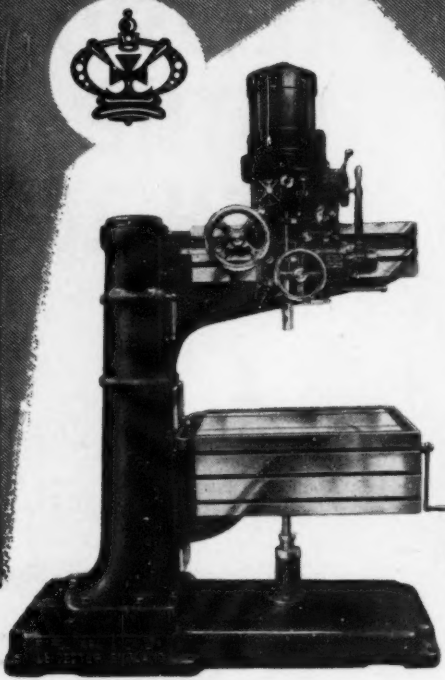
MIDLANDS OFFICE and SHOWROOMS: 1075 KINGSBURY ROAD, ERDINGTON, BIRMINGHAM 24. TEL.: BROMWICH 3781/2
SCOTTISH AGENTS and SHOWROOMS: ANGUS & CRICHTON (SALES) LTD., 37 DALMARNOCK RD., RUTHERGLEN, LANARKSHIRE

When answering advertisements kindly mention MACHINERY.

- ★ Swing over bed 15½ in.
- ★ Swing over carriage 9 7/8 in.
- ★ Distance between centres . . . 39 in. or 59 in.
- ★ Spindle speeds in either direction (8)
32-1,000 r.p.m.

- ★ Hardened and ground gears
- ★ Full range of Whitworth (4-60 T.P.I) and metric threads can be cut.

Equipment supplied with machine includes:
4-way Toolpost; Fixed and travelling steadies; Coolant: 13½ in. dia., 4-jaw face-plate.



CORONA

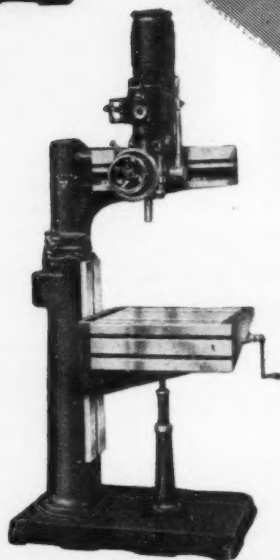
*LIGHT &
MEDIUM DUTY*
RADIALS

MODEL 3KX

36 in. or 48 in. SWING
8 SPINDLE SPEEDS
3 AUTOMATIC FEEDS
ELECTRIC REVERSE
HAND WORM FEED
No. 3MT
1 in. CAPACITY IN MILD STEEL

MODEL 2MY

24 in. or 36 in. SWING
9 SPINDLE SPEEDS
No. 2MT
 $\frac{3}{8}$ in. CAPACITY IN MILD
STEEL



► RISE AND FALL TABLES
ALSO AVAILABLE WITH
SCREW OPERATED
CANTING TABLE
IF REQUIRED

► POWERFUL CONSTRUCTION
FOR LONG LIFE

► CONVENIENTLY
ARRANGED CONTROLS

FREDK. POLLARD & CO. LTD.

CORONA WORKS, LEICESTER, ENGLAND TEL: LEICESTER 67534 (5 lines)

London Office: COASTAL CHAMBERS, 15 ELIZABETH ST., BUCKINGHAM PALACE RD., S.W.1 TEL: SLOANE 8880

Scottish Representatives: WALTER S. LANG & CO., 48 OSWALD ST., GLASGOW C.1 TEL: CENTRAL 2539

When answering advertisements kindly mention MACHINERY.

Is your heating system EFFECTIVE?

—————> **Is it ADEQUATE?**

—————> **Is it ECONOMICAL?**



Sturtevant Radiant Heating installation using standard plain, and curved panels.



A Sturtevant Unit Heating installation in a machine shop.

Sturtevant Heating Systems put heat where it should be—at working level, and give maximum results at economic overall cost.

**STURTEVANT
HEATING SYSTEMS
INCLUDE :**

- Plenum Heating and Ventilation
- Direct Heating in combination with Tempered Air supply
- High Pressure Hot Water Heating
- Unit Heating
- Radiant Panel Heating
- Convactor Heating

Sturtevant engineers are experienced in all forms of heating and ventilation systems, and are always ready to design and install efficient plant to meet clients' requirements and site conditions.

For further particulars
write to our reference MY 101Z.

STURTEVANT

ENGINEERING CO. LTD.

Southern House, Cannon Street, LONDON, E. C. 4.

AUSTRALIA: STURTEVANT ENGINEERING CO. (AUSTRALASIA) LTD. 400 SUSSEX STREET SYDNEY N.S.W.

When answering advertisements kindly mention MACHINERY.

Clarkson

for the

full range of

MILLING CUTTERS AND REAMERS

Die Sinking Cutter

Long Series
Taper Shank ReamerLong Series
Grinding Size ReamerShort Series
Taper Shank Reamer

Short Series Taper Shank Reamer

Cylindrical
Cutters

Cylindrical Cutters

Die Sinking Cutter

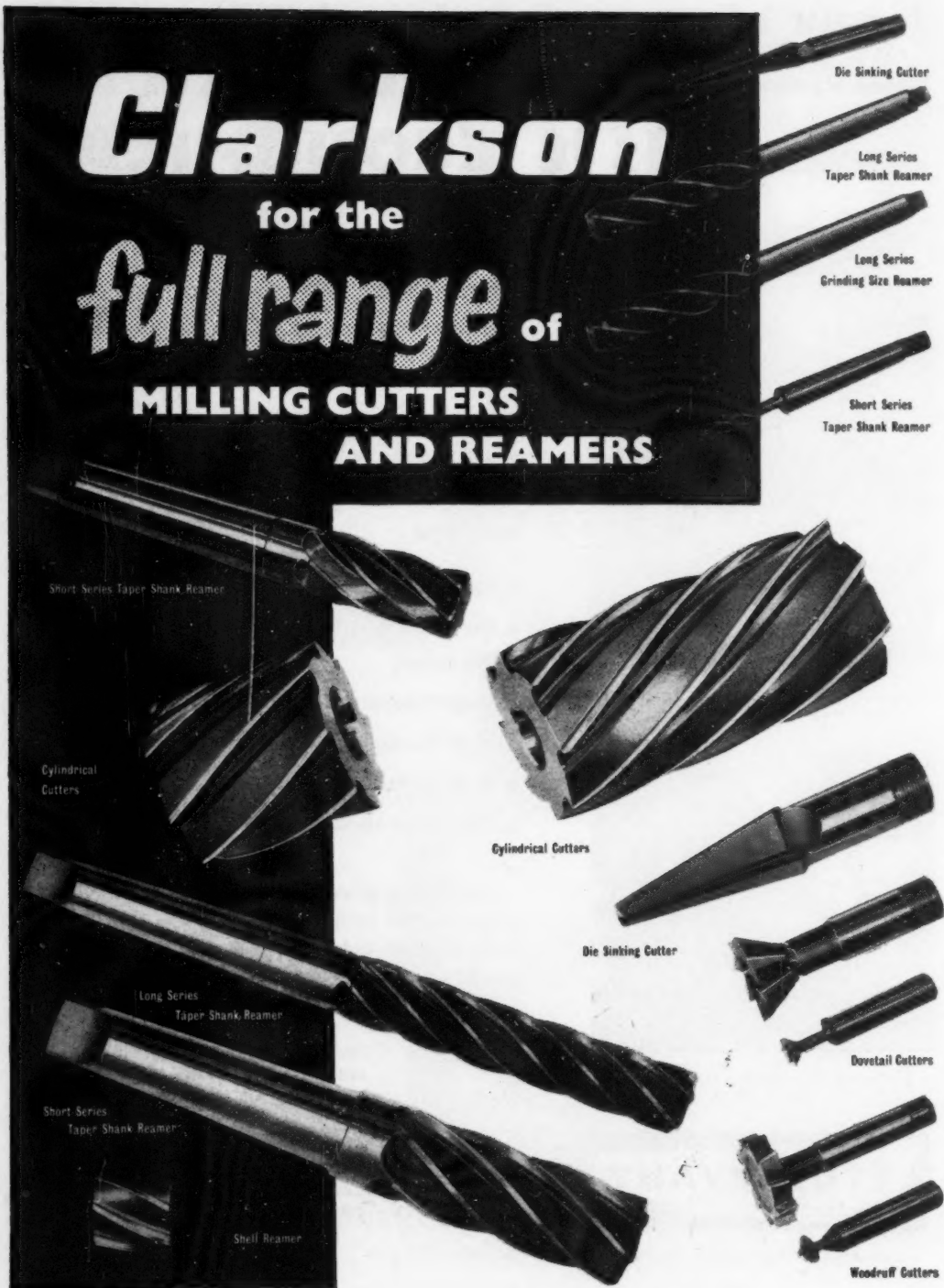
Long Series
Taper Shank Reamer

Dovetail Cutters

Short Series
Taper Shank Reamer

Shell Reamer

Woodruff Cutters



Angle Cutter

Facing Cutter

Facing Cutter

Spiral Side & Face Cutter

Spiral Side & Face Cutter

Long Series Slot Drills

T Slot Cutters

Long Series End Mills

Standard Slot Drills

Counterbores

Standard End Mills

**Clarkson quality and
DELIVERY BY RETURN!**

CLARKSON (ENGINEERS) LTD.

Newcastle 241, Westgate Road, 1.
Birmingham 15, Heath Mill Lane, 9.
London 124, Hammersmith Road, W.6.
Manchester 98, Oxford Road, 13.

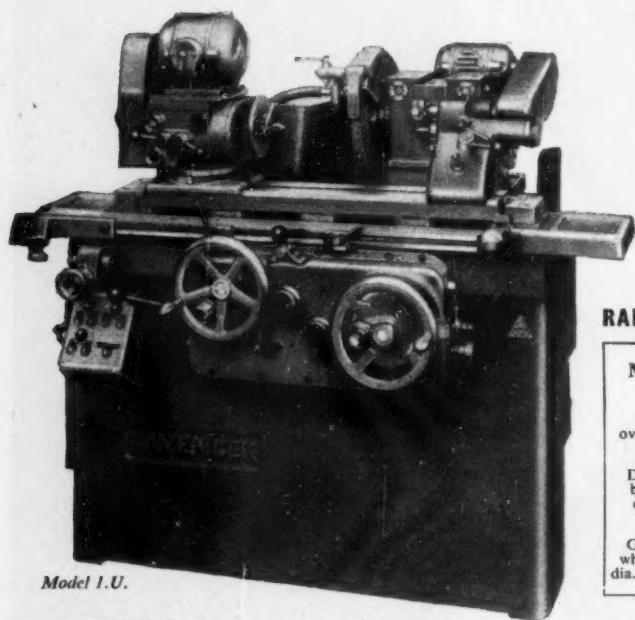
Head Office and Works
NEWcastle 2-5248
VICtoria 3994
RIVerside 8241
ARDwick 4804

Nuneaton 2261
Bristol 17, Cumberland Street, 2.
Belfast 32, Shaftesbury Square
Glasgow 430, Crown Street, C.S.
Leeds 8a, Britannia House, 1.

Bristol 2-8464
Belfast 20025
SOUth 1942
LEeds 26369

KAMENICEK

UNIVERSAL GRINDING MACHINES



Model 1.U.

Heavy duty precision built, for cylindrical (external and internal) as well as for taper and face grinding. Hydraulic table traverse; hydraulic infeed; swivelling wheel head; work-head with six spindle speeds swivels 90 degs. for taper and face grinding.

RANGE INCLUDES:

Models	1.U.	2.U.	5.U.	7.U.
Swing over table	10"	11.6"	15½"	26"
Distance between centres	15½"	20", 30", 40"	40", 59", 79"	98½", 118"
Grinding wheel size: dia./face/hole	11.8" x 1" x 3"	13.8" x 1.57" x 5"	17.7" x 2" x 8"	20" x 3" x 8"



Sole Agents.

**Immediate Delivery from
our London Showrooms**
(Subject to prior sale)

The Selson Machine Tool Co. Ltd

41-45 MINERVA ROAD, NORTH ACTON, LONDON, N.W.10

Telephone: Elgar 4000 (10 lines) Telegrams: Selsomachi, London, N.W.10

600
GROUP

56,5MT/167

When answering advertisements kindly mention MACHINERY.



LOW-SPEED MOTOR UNITS

Type RGD with : —

- CO-AXIAL DRIVE
- RATIOS UP TO 25:1
- POWER OUTPUTS UP TO 25 h.p.
- A.C. or D.C.

The motor component may be a squirrel-cage (including British Standard Dimension), slip-ring, or D.C. machine; a variety of enclosures are available to suit the application.

Neither gears nor motor is disturbed by removal of the top-half casing.

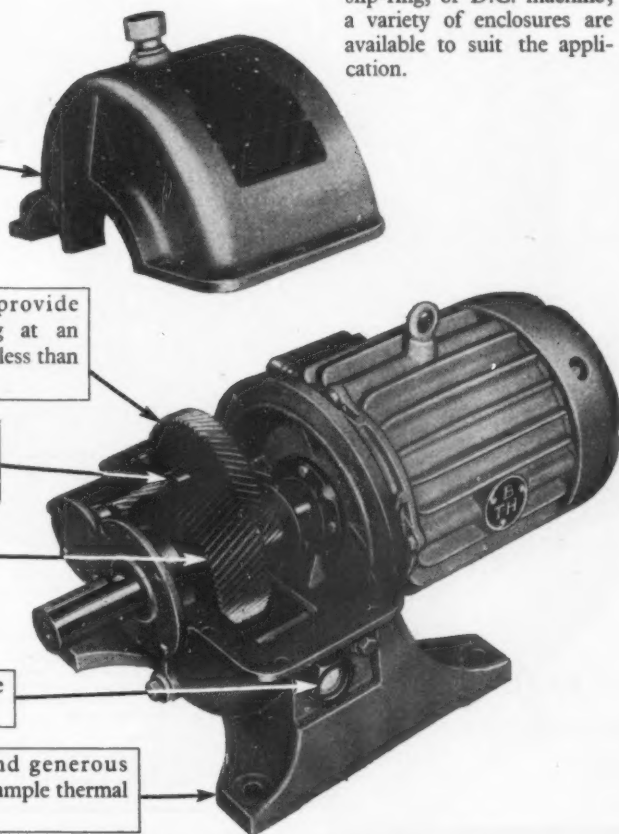
Helical teeth provide smooth running at an efficiency of not less than 98%.

All pinions, wheels, and bearings readily accessible for inspection.

Low specific loading of gears and bearings ensures long life.

Visible oil level for ease of maintenance.

Robust and generous casing has ample thermal capacity.



BRITISH THOMSON-HOUSTON

THE BRITISH THOMSON-HOUSTON COMPANY LIMITED • RUGBY • ENGLAND
an A.E.I. Company

AS196

When answering advertisements kindly mention MACHINERY.



Automatic Die Sinker

for HORIZONTAL...
VERTICAL...
MIRROR...
CIRCULAR...
SEGMENT COPYING

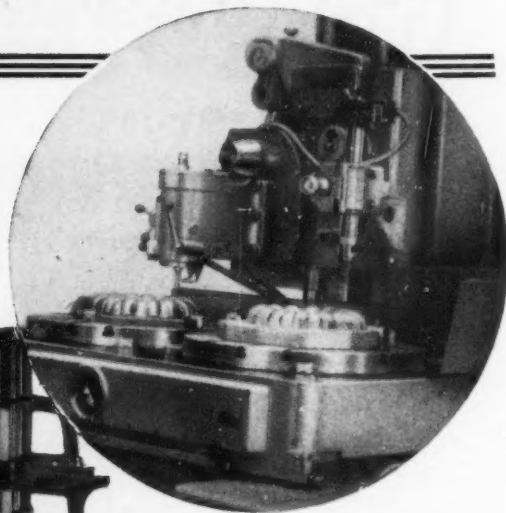


Illustration shows machine copying with vertical attachment fitted, and using the two rotary tables.

MODEL FK08c TWO MILLING SPINDLES

Arranged with 2 angle plates for simultaneous reproduction of two components.

EARLY DELIVERY

EXCLUSIVE DISTRIBUTORS IN THE UNITED KINGDOM

CAPACITY

Table, two Rotary Tables ...	...	...	27½ in. dia.
Longitudinal Table Traverse (automatic) ...	...	...	39½ in.
Transverse movement of slide ...	...	...	15½ in.
Vertical travel of spindle head ...	...	...	31 in.
Spindle Speeds (8) ...	...	...	70 to 800 or 335 to 3,600 r.p.m.
Feeds (8) ...	...	...	...
Longitudinal Table Feed (per min.) ...	...	...	¼ in. to 8½ in.
Spindle Vertical Feed (per min.) ...	...	...	¼ in. to 5½ in.
Net weight approx. ...	...	...	9½ tons.

ELGAR

Send for comprehensive illustrated brochure
MACHINE TOOL COMPANY LIMITED

RIGHT OPPOSITE NORTH ACTON STN.

172-178 VICTORIA ROAD · ACTON · LONDON W3 · Telephone ACORN 5555
MIDLANDS OFFICE and SHOWROOMS: 1075 KINGSBURY ROAD, ERDINGTON, BIRMINGHAM 24. TEL: CASTLE BROMWICH 3781/2
SCOTTISH AGENTS and SHOWROOMS: ANGUS & CRICHTON (SALES) LTD., 37, DALMARNOCK RD. RUTHERGLEN, LANARKSHIRE
NR2 2082



What does it cost to drive
a 10kW Generator from a
14/22 h.p. Armstrong Siddeley
Air Cooled Diesel?

\$0.01385 (1.175d.) per kW/hour*

**ACTUAL COSTS FOR
2606½ HOURS RUNNING WERE:**

Diesel fuel (less tax: 1178 gals.) \$259.27
Lubricating oil, filters, etc. \$81.71
Spare parts (fuel filter assembly) \$20.35
Fuel consumption (Gals. Hour) 0.441

*Figure supplied by Gt. Raymond Paper Co. of Lac Brûlé
Canada.

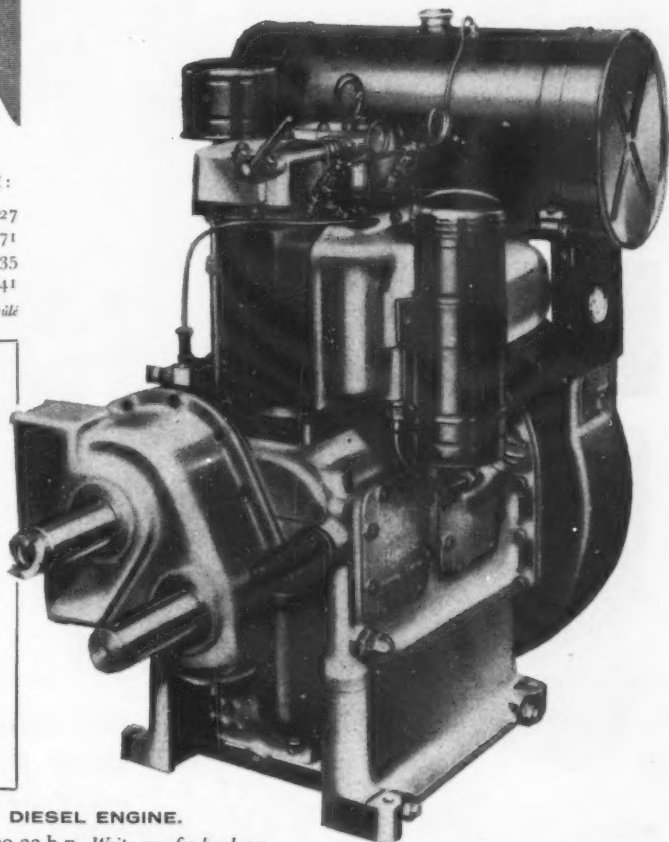
YEARS OF KNOW-HOW: The diesel engines are manufactured with the same precision as Armstrong Siddeley's world-famous aero engines.

MATERIAL-CHECKED:

Armstrong Siddeley experts regularly visit suppliers of materials and components to check on their quality controls.

PRODUCTION-CHECKED:

As well as the standard bench test, which every engine undergoes, far more extensive tests are regularly made on engines taken at random from the production lines and all ASM diesels are approved by Lloyds and the Dutch Bureau Veritas.



THERE IS NO MORE RELIABLE DIESEL ENGINE.

Three models: 6-11 h.p., 14-22 h.p., 20-33 h.p. Write now for brochures.

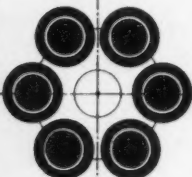
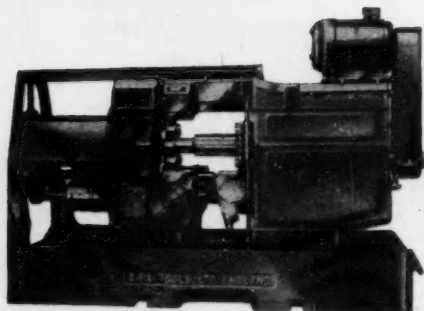
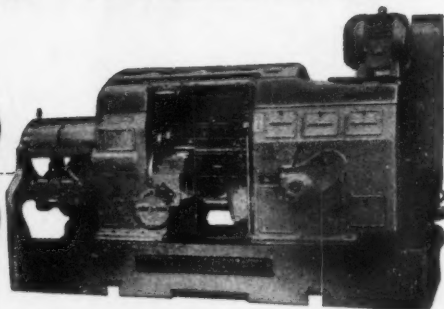
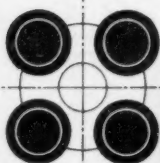
ARMSTRONG SIDDELEY AIR COOLED DIESELS

ARMSTRONG SIDDELEY MOTORS Coventry and Brockworth/ENGINE BUILDERS TO THE WORLD

When answering advertisements kindly mention MACHINERY.

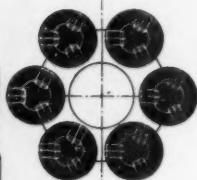
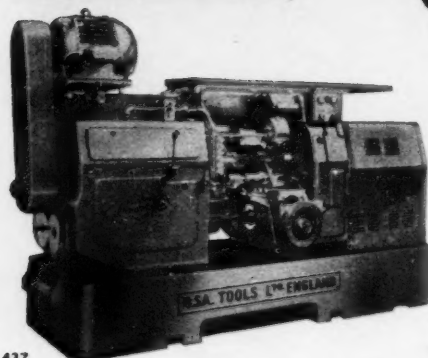
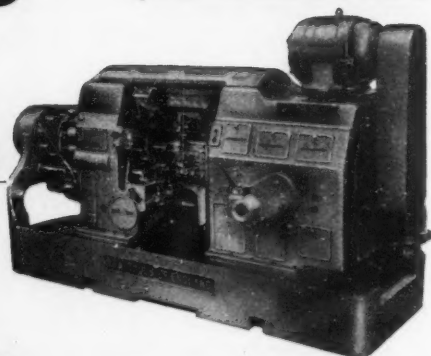
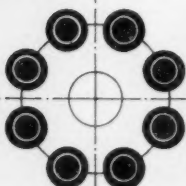
B·S·A ACME-GRIDLEY

BAR
2 $\frac{1}{4}$ ", 3 $\frac{1}{2}$ "
FOUR SPINDLE



BAR
7 $\frac{1}{16}$ ", 1 $\frac{1}{4}$ ", 1 $\frac{5}{8}$ ", 2 $\frac{5}{8}$ "
SIX SPINDLE

BAR
1 $\frac{5}{8}$ "
EIGHT SPINDLE



CHUCKING
6"
SIX SPINDLE

437

MAKERS:
B.S.A. TOOLS LTD · BIRMINGHAM · 33
ENGLAND



*the multi-spindle autos
with positive direct-
action quick-change
cam control*

SOLE AGENTS GT. BRITAIN: BURTON GRIFFITHS & CO. LTD. KITTS GREEN BIRMINGHAM STECHFORD 3071

When answering advertisements kindly mention MACHINERY.

POWER FOLDING . . .

THESE NEW FOLDING MACHINES ARE FABRICATED FROM HEAVY STEEL PLATE, WELL RIBBED AND BRACED FOR STRENGTH AND RIGIDITY VIRTUALLY UNBREAKABLE! ALL CASTINGS CARRYING FRONT FOLDING BEAM AND TOP BEAM OF HIGH GRADE STEEL.

Will handle a wide range of intricate operations with extreme accuracy. Provision for TRUE RADIUS BENDS and NARROW RETURN BENDING.



**ALL STEEL
construction
Unbreakable**

Graduated scales ensure quick and accurate setting, and adjustable back gauges cover repetition work. Drive from reversing motor gives a smooth, equal lift. Gears and drive enclosed under bed of machine. Operated from a floor-mounted remote control panel with "stop", "start" and "reverse" push-buttons. Magnetic brake ensures positive control. Fitted with replaceable bronze bearings.

The New Besco Production
All Steel Motorised
**FOLDING
MACHINE**
(Made in 5 sizes)

Note.—Folding Machines for hand operation are available from 3ft. to 10ft. capacity.

DESIGNED AND BUILT BY . . .

F.J. Edwards Ltd

Edwards House, 359-361, Euston Rd., London, N.W.1

Telephones: EUSTON 4681 (7 lines), 3771 (4 lines).
Telegrams: Bescotools, Norwest, London.

Lansdowne House, 41, Water Street, Birmingham, 3

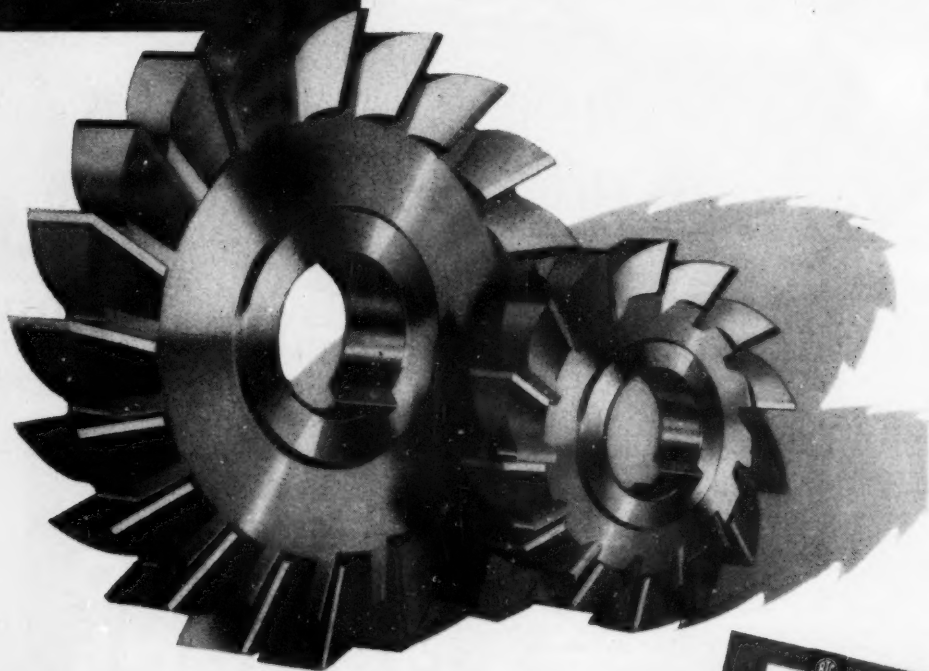
Telephones: CENTRAL 7606-7.
Telegrams: Bescotools Birmingham 3.

Model No.	M.614	M.814	M.612	M.812	M.1016
Max. length ...	73 inches	97 inches	73 inches	97 inches	121 inches
Max. thickness ...	14 gauge	14 gauge	12 gauge	12 gauge	16 gauge
Min. flange ...	lin.	lin.	lin.	lin.	lin.
Max. radius ...	lin.	lin.	lin.	lin.	lin.
Adjustment to folding centre and beam ...	lin.	lin.	lin.	lin.	lin.

When answering advertisements kindly mention MACHINERY.



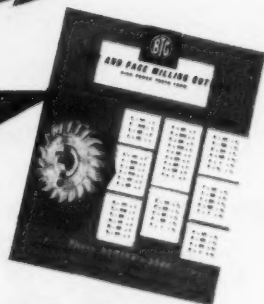
standard side and face cutters FROM STOCK



The Birmingham Tool and Gauge Company now offer standard Side and Face Cutters from stock. This stock ranges from $2\frac{1}{4}$ " to 8" diameter in the most frequently used widths; a bore size of $1\frac{1}{4}$ " is adopted for all cutters 5" diameter and over. The entire range conforms to B.S.I. specification together with High Power tooth form and are immediately available.

Despatch is guaranteed by return.

Write for Stock Card or Leaflet showing precise sizes immediately available to you.



BIRMINGHAM TOOL & GAUGE CO. LTD SOHO HILL, BIRMINGHAM 19

Telephone: NORTHERN 3344

Telegrams: RELIEF BIRMINGHAM 19

LONDON OFFICE: 26 HOLBORN VIADUCT, LONDON, E.C.1

Telephone: FLEET STREET 6454

Telegrams: BIRMTOL, CENT, LONDON

See also

When answering advertisements kindly mention MACHINERY.



FAST VERSATILE ECONOMICAL

SENTINEL UNIT MACHINES incorporating the Renault-France system electro-mechanical heads.

Built for—Drilling, Boring, Facing and Chamfering. 8 different types of Manifolds (see inset). Two manifolds are loaded, pneumatically located and clamped.

Press a button to start—and in less than 30 seconds the machining cycle is completed!

AN EXAMPLE OF FLEXIBILITY

This Unit Machine comprises a 3 ft. Dry Base, and an EMH 10 with Boring, Facing and Chamfering Tools.

3 way Centre Base.

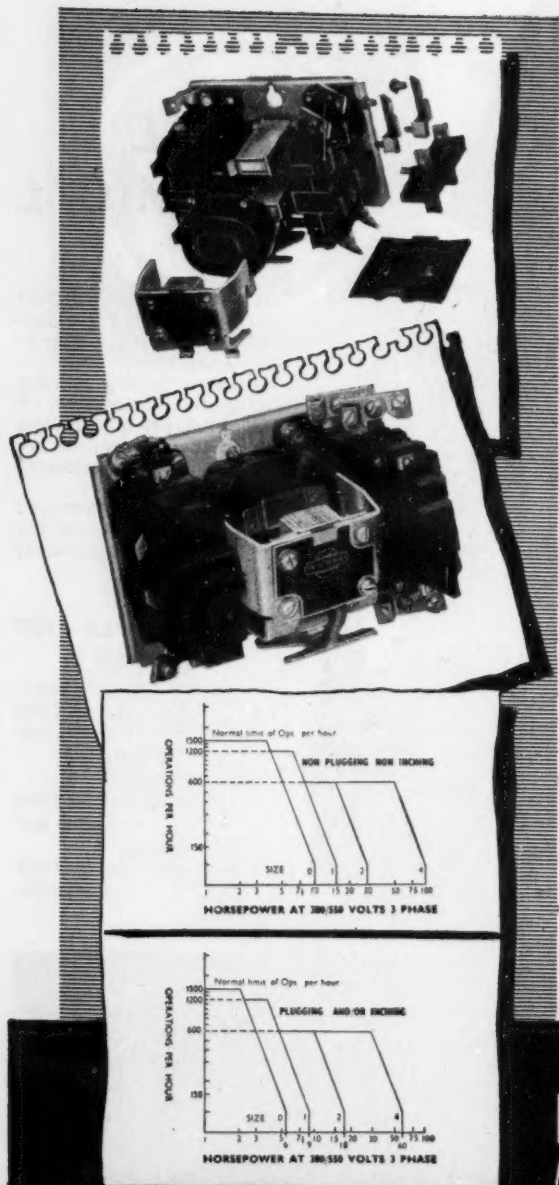
4 ft. Dry Base, and an EMH 10 with Boring, Facing and Chamfering Tools.

Bridge Column, and an EMH 20 with a 12 multi-spindle head.



Telephone: Shrewsbury 2011 Telegrams: "Sentnell Shrewsbury" London Office: 15 Conduit Street, London, W.1 Telephone: MAYfair 2675 P4108

When answering advertisements kindly mention MACHINERY.



IGRANIC block-type contactor

—engineered for frequent & heavy duty

We got down to all-round basic simplicity

when we designed this new
Igranitic Block-type Contactor.

We've made it smaller—it occupies less space than hitherto—and simplified installation by providing key-hole slot mounting, and really accessible connectors—the wires slip straight in and are pressure clamped to give a positive joint. Pull-off, snap-on, contact covers, slide-out moving-contact assemblies and lift-out armature simplify maintenance. Operational efficiency has been improved by using vertically mounted, twin-break 'dust-safe' heavy-duty silver contacts, providing ample arc rupturing capacity by induced pressure in totally enclosed arc chambers, and self-cleaning armature pivot bearing surface. Auxiliary contacts and electrical interlocks are added easily.

PERFORMANCE Study these data-ratings!

RANGE A.C. Ratings up to 30 h.p. now, beyond 100 h.p. shortly.

Can be provided with D.C. operating magnet.



IGRANIC ELECTRIC CO LTD
HEAD OFFICE & WORKS BEDFORD ENGLAND

LONDON & EXPORT OFFICES: VICTORIA STN HOUSE 191 VICTORIA ST SW1

A Metal Industries Group Company

DISTRICT OFFICES: BIRMINGHAM BRISTOL CARDIFF EAST ANGLIA GLASGOW LEEDS MANCHESTER NEWCASTLE SHEFFIELD

P.1072/10/58

IS YOUR GEAR INSPECTION UP TO DATE?

To-day's gear production, jobbing or repetitive, calls for inspection equipment that will give the correct answer in the shortest time. In one operation, the David Brown 9R Roll Tester, which is motor driven, checks concentricity, kick-off, tooth marking, centre distance and tooth thickness

DIRECTLY • ACCURATELY • SPEEDILY

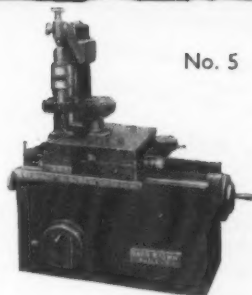
and makes an automatic permanent record of concentricity and kick-off by means of the integral Graphic Recorder, which gives a pen trace with a magnification of 250:1 for spur, helical and bevel gears.

This instrument can also be provided for hand control, without the Graphic Recorder, for spur, helical, bevel and worm gears, and is one of a range of Roll Testers with capacities up to 5", 9", 15" and 24" centre distances.

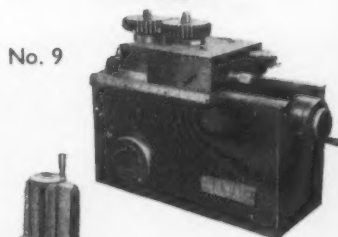
Take the first step towards bringing your Gear Inspection up-to-date by writing for Leaflet E311.15.



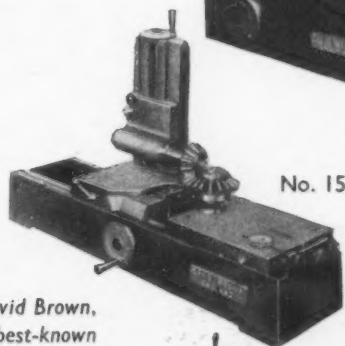
No. 9R motor-driven,
with Graphic Recorder



No. 5

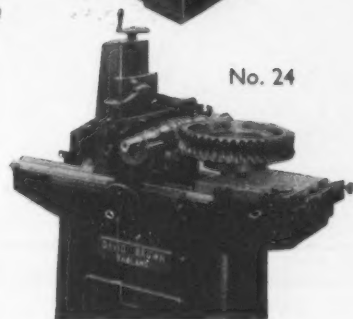


No. 9



No. 15

*Made by David Brown,
the world's best-known
name for gears.*



No. 24

THE
DAVID BROWN
CORPORATION (SALES) LIMITED
TOOL DIVISION
PARK WORKS HUDDERSFIELD

When answering advertisements kindly mention MACHINERY.

JONES - SHIPMAN PRODUCTION GRINDING MACHINES**HEAVY DUTY AUTOMATIC**

with toolroom accuracy

DESIGN FEATURES INCLUDE...

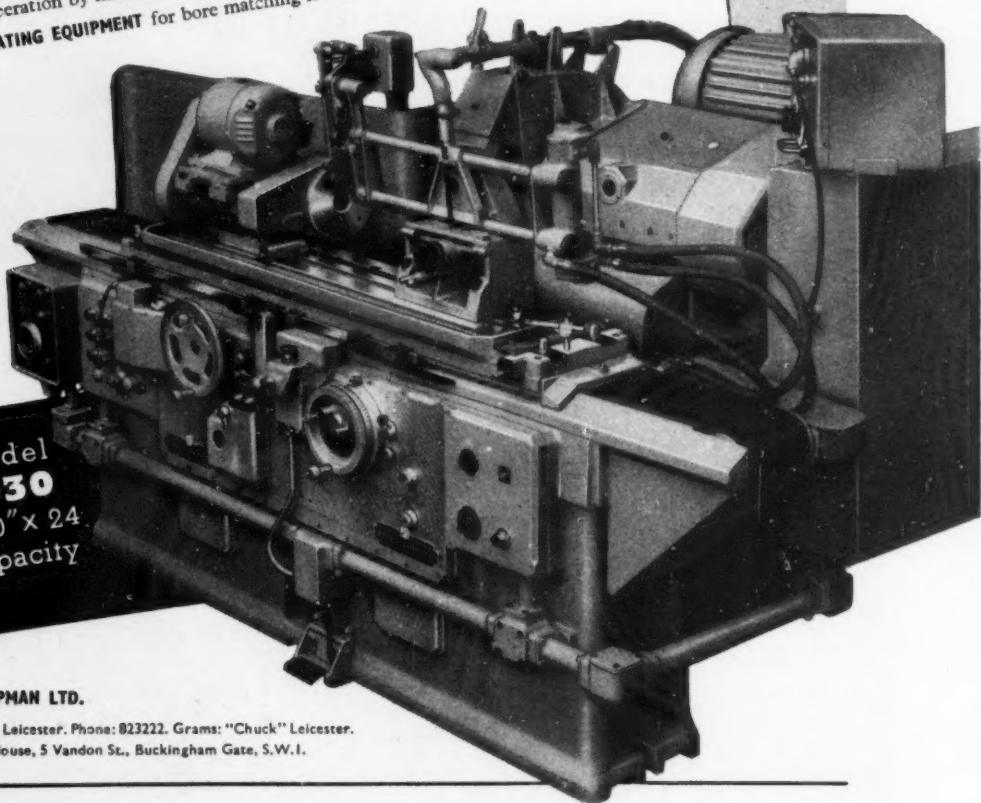
- Automatic cycle of operation—all controls interlocked to a single button.
- Hydraulic cross-feed unit built at rear of wheel.
- Massive wheelhead with 15 or 30 H.P. motor drive for 4in. or wider wheels.
- Dwell period up to 5 seconds on either ends of table traverse.
- Automatic wheel truing and wheel wear compensation.

SIZING ARRANGEMENTS

ELECTRONIC DIAMETER CONTROL with caliper gauge head.
Operation by hand or automatically with patented arrangements.

MATING EQUIPMENT for bore matching is also available.

model
1030
7" or 10" x 24
capacity

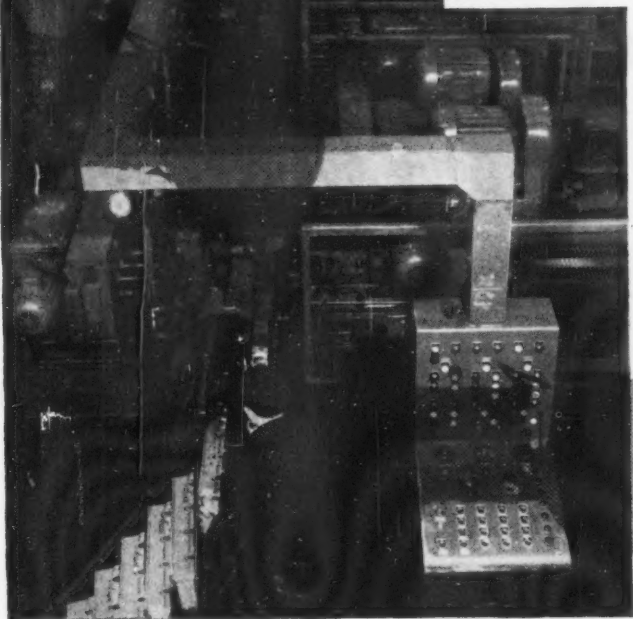


A. A. JONES & SHIPMAN LTD.

Narborough Rd. South, Leicester. Phone: 823222. Grams: "Chuck" Leicester.
London Office: Murray House, 5 Vandon St., Buckingham Gate, S.W.1.
Tel: Abbey 5968'9.

When answering advertisements kindly mention MACHINERY.

Automation at



A first-class machine tool is always a major asset in any industry but its efficiency and rate of output are considerably increased by first-class control.

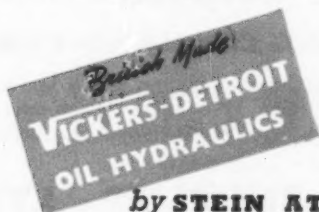
That is why, in a highly competitive market, Ford Motor Company Limited uses the Asquith 47-Station Inline Transfer machine, equipped with

VICKERS-DETROIT Oil Hydraulics for drilling, boring, reaming and tapping operations on 4 and 6 cylinder tractor heads.

View from the loading end of machine. Vickers-Detroit hydraulic units ensure perfect control of sequence operations, and uniform precision of components on leaving the machine.

View of a Vickers-Detroit control unit at the unload end.

For further details please write for publication 1/42



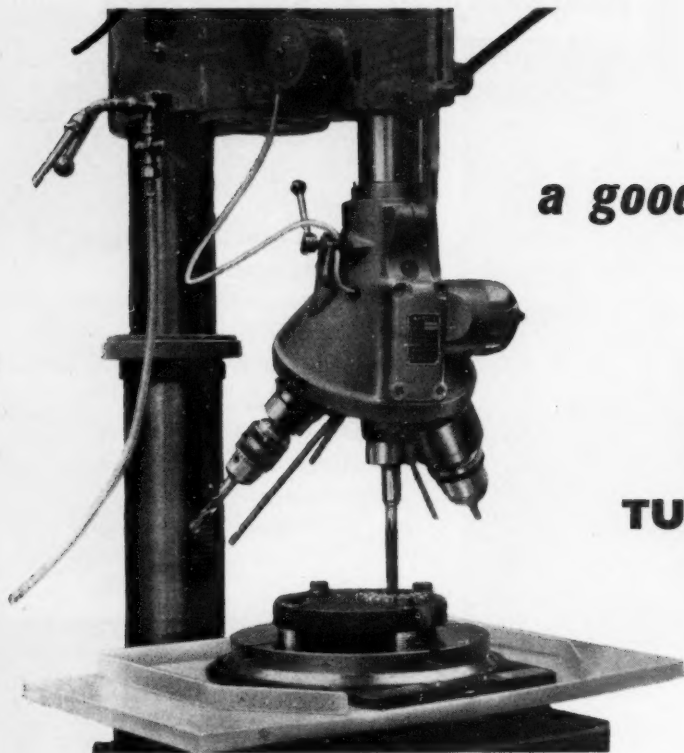
by STEIN ATKINSON VICKERS HYDRAULICS LIMITED

S.A.V. HYDRAULICS 197 KNIGHTSBRIDGE, LONDON, S.W.1

Broadsheet/savh/42

When answering advertisements kindly mention MACHINERY.

E



a good combination

THE
Arbo
TURRET DRILL
HEAD

The illustration shows an ARBO Head with 1" capacity mounted on a GRIMSTON ELECTRISKA Type EC 48 Drilling Machine

Provides on single drilling spindle for up to 7 operations, including tapping, at up to 10 different speeds, without changing the machine speed.

Automatic Indexing.

Independent depth stop for each station.

Two sizes with $\frac{3}{8}$ " and 1" capacity.

and the **Thoka**

12 IN. FLOATING COMPOUND TABLE

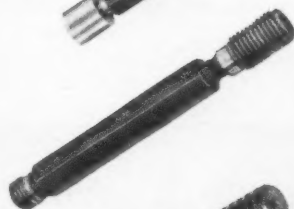
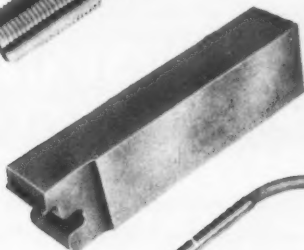
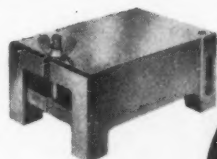
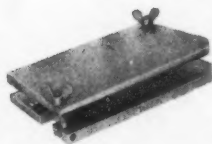
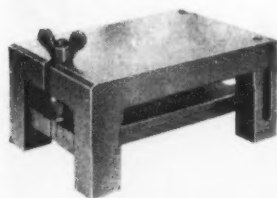
It floats on air for effortless positioning and is locked by air pressure during drilling or tapping. Foot operated pneumatic control. Special model for indexing and dividing.

THOKA

MACHINERY SUPPLIES LTD.

2 DRAPERS GARDENS, LONDON, E.C.2

Phone: NATional 7391



AMAR

tools and gauges

LEAF DRILL JIGS

SANDWICH DRILL JIGS

BOX DRILL JIGS

PLUG GAUGES

THREAD GAUGES

GAP AND PLATE GAUGES

RING GAUGES

FORM TOOLS

TAPS

THREAD GRINDING

For full information write for Publication No. 1109

AMAR

TOOL AND GAUGE COMPANY LIMITED

Amar Works, Grove Road, Chadwell Heath, Essex. Tel: Seven Kings 3471-2-3 5090 & 5369

Overseas Sales Organisation: Plessey International Limited · Ilford · Essex · Telephone Ilford 3040

One of the Plessey Group of Companies

AT2

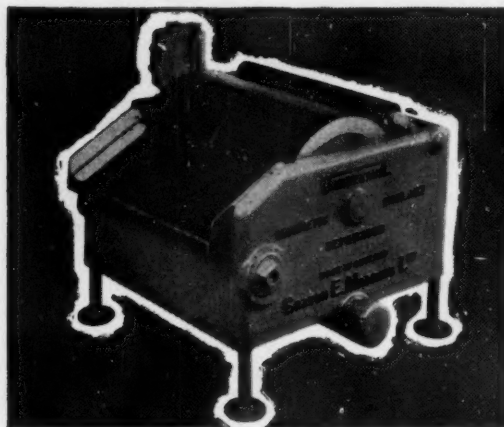
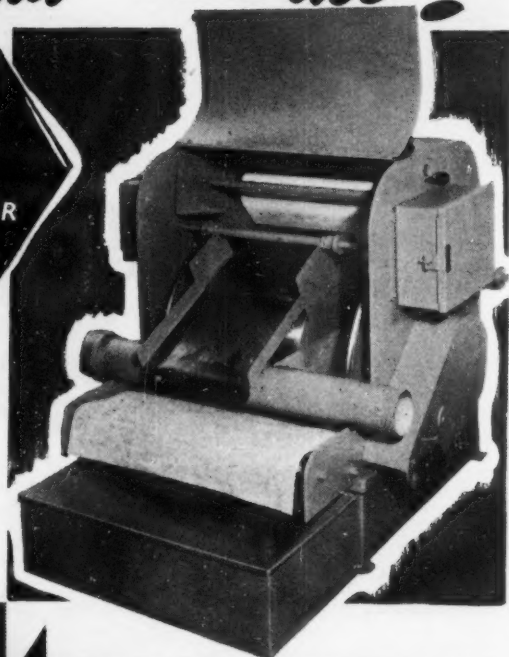
When answering advertisements kindly mention MACHINERY.

Which one should YOU use?

BARNESDRIL

KLEENALL MAGNETIC FILTER

- Remove magnetic and non-magnetic particles from metal cutting fluids.
- Economical, Automatic Operation.
- Rapid, Double cleaning Action.
- Controlled removal of non-ferrous metal.



BARNESDRIL

AUTOMATIC-MAGNETIC COOLANT SEPARATOR

- Permanent ALCOMAX magnets ensure infinite life.
- Extra long magnetic field overcomes viscosity resistance on small particles.
- Approximately 235 square inches of magnetic drum surface in contact with loaded coolant in the No. 2 size.
- Counter rotation of magnetic drum removes non-metallic particles.

Patent Nos. 603083,
731655 and 745604.
Others pending.

Infringement will be
prosecuted.



There are, of course, applications where one does a better job than the other. Since we make them both, we're completely impartial. We'd be glad to advise you which is the best solution to your problem. Write today to Dept. M.11 and ask for Catalogues describing the many types and models available.

Originators of the Drum Type Magnetic and Combination Separators

GASTON E. MARBAIX LTD

DEVONSHIRE HOUSE VICARAGE CRESCENT
BATTERSEA, LONDON S.W.11
PHONE BATTERSEA 8888 (8 lines)



Victomatic

Automatic
**MILLING
MACHINES**

VICTOMATIC 2-30"



Fully automatic 2-way milling cycle for faster machining

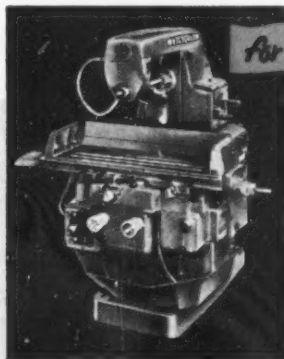
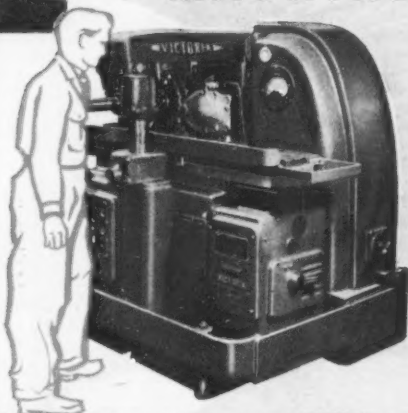
Push-button operation for short runs

Large worktable 50" x 10"

Independent motors for quick traverse and feeds

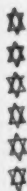
20 Spindle speeds 30 — 1100 r.p.m.

24 Table feeds 1 to 40 in./min. Rapid traverse 160 in./min.



for BATCH or CONTINUOUS PRODUCTION

VICTOMATIC 0-18"



Right or left hand cycle milling

Continuous or interrupted pendulum milling

Table working surface 36" x 10½"

Automatic backlash eliminator for climb milling

12 Spindle speeds 45-1215 r.p.m.

16 Table feeds 0.06 — 16 in./min. Rapid traverse 150 in./min.

WICKMAN LIMITED



FACTORED MACHINE TOOL DIVISION, FLETCHAMSTEAD HIGHWAY, COVENTRY

Telephone: Coventry 74321

When answering advertisements kindly mention MACHINERY.

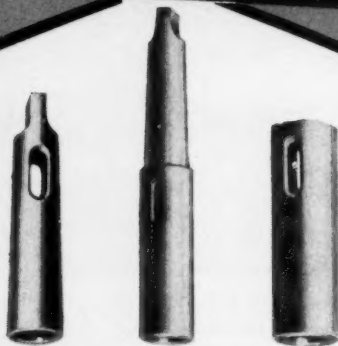
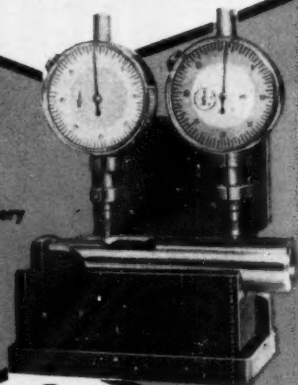
521FXX/34

for guaranteed
accuracy and
reliability,
equip with

ARCHER

DRILL SLEEVES and SOCKETS

The famous Archer Drill Sleeves and Sockets, made in two qualities are precision guaranteed, accurately ground to standard Morse Taper tapers and tested to very fine limits of concentricity—Archer Drill Sleeves and Sockets will remain true under the most strenuous conditions.



SUPER QUALITY—Hardened all over. Accurately ground internally and externally.
STANDARD QUALITY—Oil toughened with hardened tang. Ground externally.

* Ask for List No. 45B

FRANK GUYLEE & SON LTD.

ARCHER TOOL WORKS · MILLHOUSES · SHEFFIELD 8

Telegrams: "Guylee, Sheffield" Telephone: 50061-2

When answering advertisements kindly mention MACHINERY.

Five steps to
Prosperity

Intensified
MECHANISATION

Renewed
EQUIPMENT

Increased
PRODUCTION

Improved
TRANSPORT

Better
DISTRIBUTION

All these call for more **CAPITAL**
which Equity plans will provide.

EQUITY CREDIT

COMPANY LIMITED

INDUSTRIAL BANKERS

24 Berkeley Square, London, W.1

Telephone: MAYfair 9090

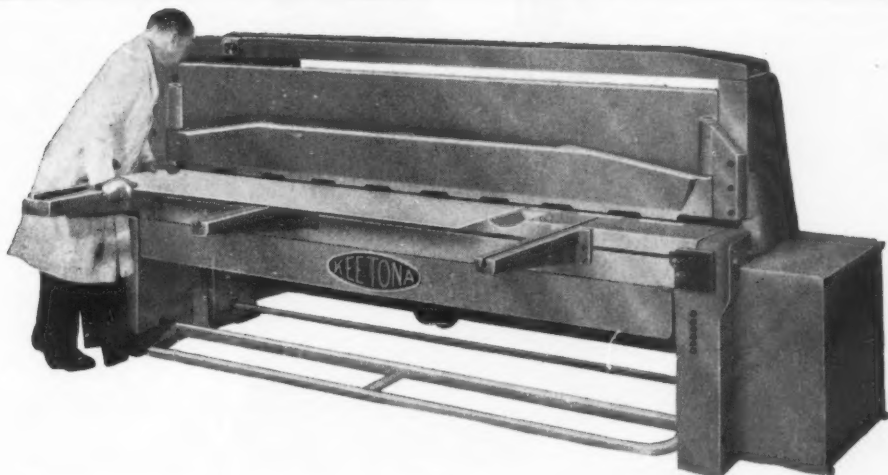
Midlands Office:

88/89 Darlington Street, Wolverhampton, Staffs

Telephone: Wolverhampton 26545



A new 8' x $\frac{1}{8}$ " guillotine from Keetons



We have designed a new Guillotine Shear in order to meet the present day demands of industry for first class Machine Tools at low prices. This Guillotine now in production, is illustrated above.

Modern plant installed in our new factory, together with efficient production methods and good design, enable us to offer you a superlative shear at a considerably reduced price. Exhaustive tests have proved its outstanding performance in reliability and ease of operation. Sheets up to the full capacity of the shear are cleanly cut to accurate limits normally associated with shears of much higher price. Write for full descriptive leaflet today. Stocked and supplied by leading machine tool merchants.



KEETON, SONS & CO. LTD.

KEETONS WORKS, GREENLAND ROAD, SHEFFIELD, 9

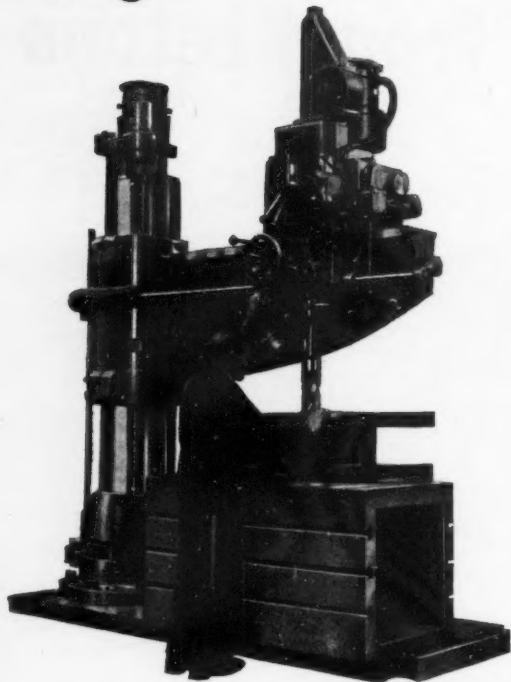


A member of
the Firth Cleveland
Group

CRC6KM

When answering advertisements kindly mention MACHINERY

they go to Town ... *



at The Park Gate Iron & Steel Co Ltd

In the Maintenance Shop a Town C.E.I. Heavy Radial Drilling Machine is kept busy on a great variety of work, in this case drilling a 3in. hole in a Blooming Mill Manipulator Head. Park Gate are very satisfied with their "Town" radials.



Makers of high class Drilling Machines for 55 years

FRED. TOWN & SONS LTD

HALIFAX · YORKS

Write for leaflets on the complete TOWN range of machines.

When answering advertisements kindly mention MACHINERY.

VICTORIA

Leads the Way!

NEW EXTENDED RANGE



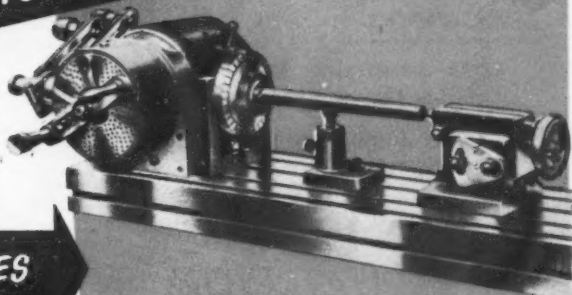
NEW ADVANCED DESIGN ...

MILLING ARBORS

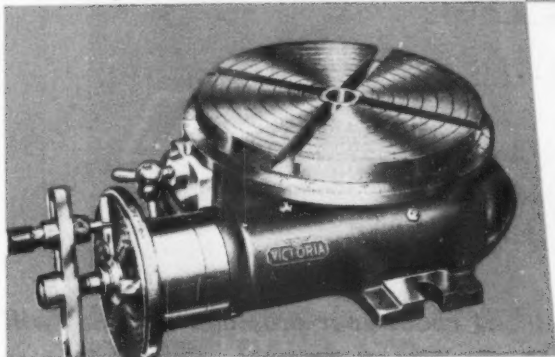
Includes sizes suitable for all modern milling machines. The best in the world.

UNIVERSAL DIVIDING HEADS

Large production plus modern methods give high precision (each head optically tested) at a new low price.



NEW REDUCED PRICES



ROTARY MILLING TABLES

Quick accurate indexing with index plates. No deflection on locking. Power drive available for 15" model.

Manufactured by

B. ELLIOTT (MACHINERY) LTD.

(MEMBER OF THE B. ELLIOTT GROUP OF COMPANIES)
VICTORIA WORKS, WILLESDEN, LONDON, N.W.10
Telephone: ELG 4040 (10 lines) Telegrams: Ellimachona, Markes, London
Overseas Subsidiaries: C&W Ltd., U.S.A., AUSTRALIA, S. AFRICA



NRP 2106

**Something
New!** **CEJ**
"HI-TEN"
TAPS

**HAVE YOU ANY REALLY TOUGH
TAPPING PROBLEMS
IN HIGH TENSILE STEELS?**

A NEW MANUFACTURING PROCESS IS GIVING
AMAZING RESULTS AND MUCH LONGER TAP LIFE
ON THESE DIFFICULT MATERIALS

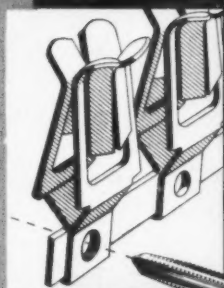
CEJ JOHANSSON LTD. ★ Tell CEJ about your problems and they will find the answer
SOUTHFIELDS ROAD, DUNSTABLE, BEDS.

DBH/7097

When answering advertisements kindly mention MACHINERY.

Not only
50,000 to 500,000
parts per 8 hours,
but more:

**An astonishing
novelty . . .**



**Tapping
and Stamping
operations**

at the same time
on the press.

FABRIQUE JOHN-A. CHAPPUIS LTD.
PESEUX NE, SWITZERLAND

JAC
CHAPPUIS

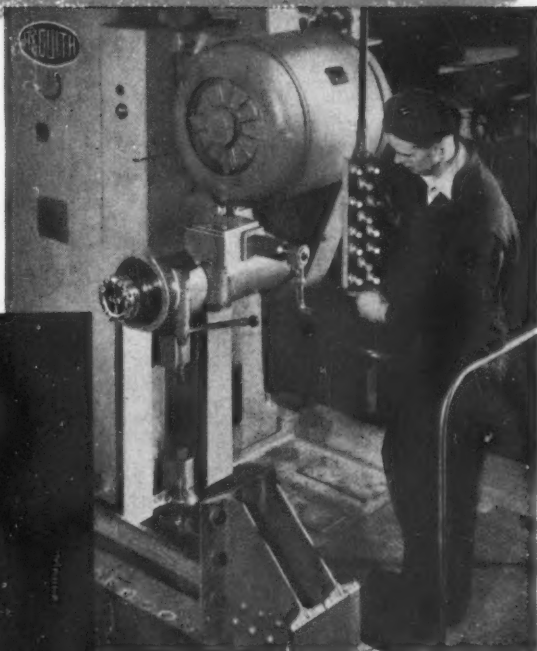
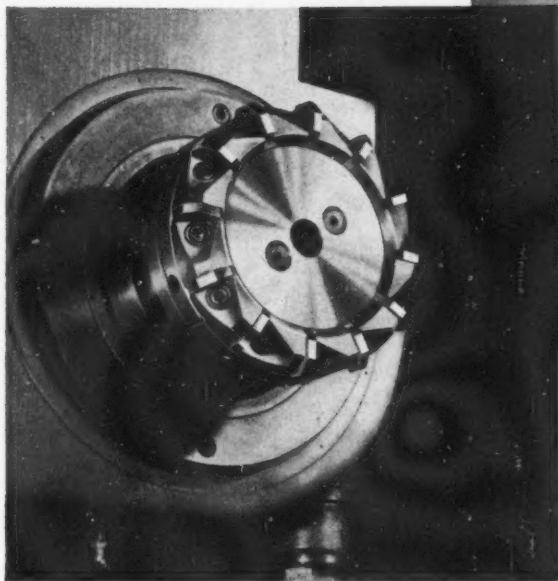
Sole Selling Agents in U.K.
STUART DAVIS LTD.,
MUCH PARK ST. COVENTRY.
Telephone: Coventry 63091-2

When answering advertisements kindly mention MACHINERY.

Prolite

FUTUR MILLS

for GIRDER END FACINGS



* For further particulars please consult our engineers who are always available to assist with all tungsten carbide machining problems.

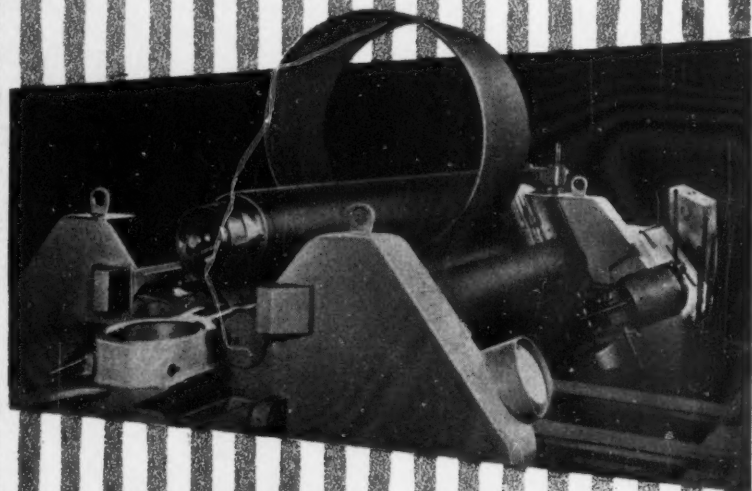
The 'Prolite' Futur Mill has been selected for use on the new Girder End Facing Machine manufactured by William Asquith Ltd. of Halifax.

This cutter has proved itself to be ideal for this and similar applications within the constructional steel industry because of the simplicity of servicing, no elaborate cutter grinding being necessary. Its usefulness is, however, not confined to one particular industry; wherever face milling is undertaken the Prolite Futur Mill can prove its merits.

Home Sales: PROLITE LIMITED (a subsidiary company of Murex Ltd.), RAINHAM, ESSEX.
 Telephone: Rainham, Essex 3322. Telex: 28632. Telegrams: Prolite, Rainham-Dagenham Telex.
Southern Area Office: CENTRAL HOUSE, UPPER WOBURN PLACE, LONDON, W.C.1.
Midland Area Office: GUILDHALL BUILDINGS, NAVIGATION STREET, BIRMINGHAM 2.
Northern Area Office: NORWICH UNION BUILDINGS, CITY SQUARE, LEEDS 1.
Export Sales: MUREX LIMITED (Powder Metallurgy Division), RAINHAM, ESSEX, ENGLAND.
 Telephone: Rainham, Essex 3322. Telex: 28632. Telegrams: Murex, Rainham, Dagenham Telex.

When answering advertisements kindly mention MACHINERY.

WILHELM BURGER

W
I
L
H
E
L
M
S
B
U
R
G
E
R

BENDING ROLLS

WITH 3, 4, AND 5 ROLLERS
ALSO FOR STRAIGHTENING WITH 7 ROLLS

- * SUITABLE FOR STRAIGHT AND TAPER BENDING of complete and accurate circles
- * SWIVELLING END BEARING AND TOP OR BOTTOM ADJUSTABLE ROLLS



PAUL GRANBY & CO. LTD.

39 VICTORIA STREET · WESTMINSTER · LONDON · S W 1

Telephone: ABBEY 5338 Telegrams: POWAFORGE, SOWEST, LONDON Cables: POWAFORGE, LONDON

When answering advertisements kindly mention MACHINERY.

NRP 1188



DANGER—eyes at work

Danger—flying sparks! Danger—molten metal! Danger—splashing acids!

Tough, clear and shatter-proof, Celastoid acetate sheeting is a safe shield against so many industrial hazards. Uniquely suitable for visors, goggles and machine guards, Celastoid does not shatter, crack or splinter. Between the worker and his work Celastoid provides economic and lasting protection.

**need the
safety of**

* *The Celanese Technical Advisory Service, with its unrivalled experience, is freely available to assist you with any special safety problems you may have.*

Celastoid
ACETATE SHEET

Shatterproof Celastoid is a product of the

PLASTICS DIVISION, BRITISH CELANESE LTD., MANOVER SQUARE, LONDON W.1 MAYfair 5009



*** LIES THE SECRET**
of successful Automatic Production

ON BATCHES AS SMALL AS 40 COMPONENTS

This new machine will give you on short runs three to four times more production than a capstan. It is worth while investigating.

Only **TAREX**

GIVES TURRET ROUGHING & HYDROCOPY FINISHING

ensuring **SIMPLE TOOLING** • **FAST SETTING** • **QUICK CHANGEOVERS** •
HIGH PRECISION • **FINE FINISH ELIMINATING MANY GRINDING OPERATIONS**

SIX TYPES FOR BAR WORK FROM 1½in. TO 3½in. DIA.

TWO TYPES FOR CHUCKING WORK UP TO 7½in. DIA.

THREE UNIVERSAL MODELS FOR BAR WORK

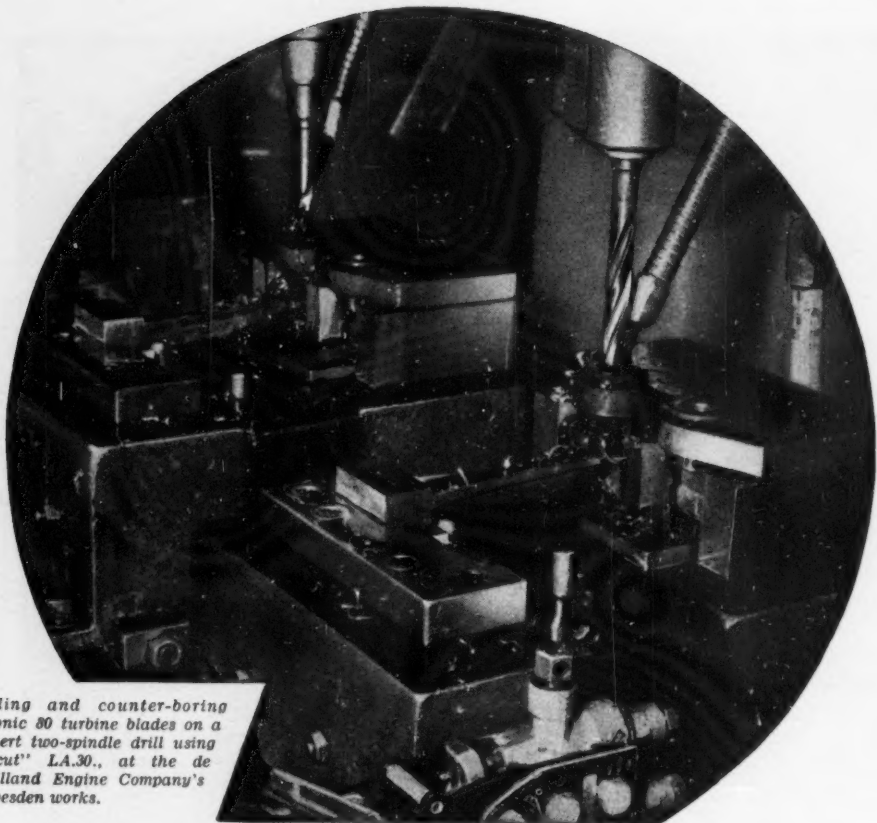
UP TO 2in. DIA. CHUCKING UP TO 7½in. DIA.

TAREX (England) LTD

**22 BUCKINGHAM GATE
 LONDON, S.W.1.**

**TELEPHONE
 TATE GALLERY 3191**

When answering advertisements kindly mention **MACHINERY**.



Drilling and counter-boring Nimonic 80 turbine blades on a Herbert two-spindle drill using "Ilocut" LA.30., at the de Havilland Engine Company's Leavesden works.

"ILO CUT"

NEAT CUTTING OILS

— used by **THE DE HAVILLAND ENGINE CO. LTD.**

"They possess exceptional cutting and surface finish properties . . . and cooling qualities which ensure long tool life between regrinding".

Those are the outstanding reasons for the pre-eminence of the "Ilocut" range of Neat cutting oils. In the de Havilland group the Engine Company and the Propeller Company both use "Ilocut". Also in common with the de Havilland Aircraft Company, they use many of our other oils. May our technical engineers call, and tell you all about our production oils? Also available to your company, a complimentary copy of "Cutting & Metalworking Oils".



WAKEFIELD-DICK INDUSTRIAL OILS LTD. • 67 GROSVENOR STREET, LONDON, W.1

A MEMBER OF THE WORLD-WIDE WAKEFIELD CASTROL ORGANISATION

When answering advertisements kindly mention MACHINERY.

MACHINERY is registered as a newspaper at the General Post Office and the name is a registered trade mark

Published every Wednesday by
The Machinery Publishing Co., Ltd.

© The Machinery Publishing Company, Limited, 1958. All rights of reproduction and translation reserved by the publishers by virtue of the Universal Copyright and International Copyright (Brussels and Berne) Conventions and throughout the World
Price 1/3

•
LESLIE R. MASON
Managing Director

CHARLES H. BURDER
Editor

LONDON OFFICE

REGISTERED OFFICE, EDITORIAL, SMALL AND CLASSIFIED
ADVERTISEMENTS DEPARTMENT AND ENQUIRY BUREAU

CLIFTON HOUSE
83-117 EUSTON ROAD
LONDON, N.W.1.

Telephone: Euston 8441/2
Telegrams: Machtool, Norwest, London

HEAD OFFICE

SUBSCRIPTION, ADVERTISEMENT, SERVICE,
PHOTOGRAPHIC, ACCOUNTS AND BOOK DEPARTMENTS

NATIONAL HOUSE
21 WEST STREET
BRIGHTON, 1.

Telephone:
Brighton 27356
(4 lines)



Telegrams:
Machtool,
Brighton

NEW YORK:
93, Worth Street

PARIS
15, Rue Bleue

SUBSCRIPTIONS:—Inland and overseas, 52 shillings per annum, post free. Cheques and Money Orders should be made payable to the Machinery Publishing Co., Ltd.

ADVERTISEMENTS:—Copy or displayed advertisements, if proofs are required, should reach the Brighton office 21 days in advance of publication. Rates on request. Small (classified) advertisements can be accepted, space permitting, at the London office up to Wednesday, for publication on the following Wednesday. For rates, see p. 159

Blocks are held at advertisers' own risk; no responsibility for loss is accepted by the publishers.

MANUSCRIPTS FOR BOOKS covering all branches of engineering production will receive careful consideration and should be sent to the Manager, Book Dept., MACHINERY, National House, 21 West St., Brighton 1.

MACHINERY

A JOURNAL OF METAL-WORKING PRACTICE
AND MACHINE TOOLS

Vol. 93, No. 2401

November 19, 1958

COPIES PRINTED.....11,500 per week

CERTIFIED DISTRIBUTION.....11,376 per week

CERTIFIED PAID DISTRIBUTION10,566 per week

CONTENTS

Editorial

A Surplus of Steel 1155

Principal Articles (For Abstracts see next page)

Production of Cash Registers and Accounting Machines	1156
Typical Operations on Rocket Components	1169
Multifactor Type 22 Automatic Rotary Transfer Machine....	1173
Italian Machine Tool Exhibition, Milan—1	1177
New Techniques for Grinding Sintered Carbides	1186
Moore Universal Measuring Machine	1189
Atlas Works of W. H. Allen Sons & Co., Ltd.	1191
Dawson Universal Milling Arbor	1194
The Engineering Department of the Mullard Radio Valve Co., Ltd.	1197
British-built McKay Machines	1199

Short Articles

Large Magnetic Crack Detector	1168
Measuring Coating Thickness in Bores	1176
Reliance Roller Pry Bar	1185
Inspecting the Bores of Long Tubes	1188
Profile-turning Bevel Pinion Shafts	1196
Churchill-Curtis Abrasive-belt Grinding Machines	1200

News of the Industry

Halifax	1202
Lincoln	1203
Grantham	1203
Classified Advertisements	159
Index to Advertisers	187

CONDITIONS OF SALE AND SUPPLY.—MACHINERY is sold subject to the following conditions:

That it shall not, without the written consent of the publishers first given, be lent, resold, hired out or otherwise disposed of by way of trade except at the full retail price of 1s. 3d. and, that it shall not be lent, resold, hired out or otherwise disposed of in a mutilated condition or in any unauthorized cover by way of trade; or affixed to or as part of any publication or advertising literary or pictorial matter whatsoever

Abstracts of Principal Articles

Production of Cash Registers and Accounting Machines P. 1156

In this third article concerned with production methods employed by the National Cash Register Co. (Mfg.), Ltd., Dundee, the application of large Natco multi-spindle machines for drilling, reaming and counterboring operations on frame castings is described, and reference is made to the printing of number wheels by the rotary offset and screen methods. Precision grinding plays an important part in the production of many components, and particulars are given of typical operations on Jones & Shipman, Churchill, and Jones & Lamson machines. Reference is made to the company's inspection procedures, and the policy which has been adopted for the scheduled maintenance of plant is described. (MACHINERY, 93—19/11/58.)

Typical Operations on Rocket Components P. 1169

Large numbers of liquid- and solid-propellant rockets are produced by the Aerojet-General Corporation, U.S.A., and in this connection it has been necessary to overcome many manufacturing problems. Various techniques which have been developed cannot be described for reasons of security. Among the representative operations here discussed may be mentioned the copy turning of an aluminium nozzle; the drilling of deep holes in a stainless steel injector plate; the drilling of 4,000 small diameter holes in an injector head on a machine provided with a special indexing arrangement; and the copy-milling of propellant cavities in injector plates. These cavities are of two different forms, and two masters, mounted on an indexing table, can be brought into use, as required. (MACHINERY, 93—19/11/58.)

Multifactor Type 22 Automatic Rotary Transfer machine P. 1173

The Swiss-built Multifactor type 22 rotary transfer machine can be supplied with different numbers of work-holding fixtures and horizontal- and vertical-spindle cutter heads for handling a variety of small and medium-size components. Feed motions are applied by hydraulic cylinders which are incorporated in the cutter heads and supplied with fluid by other cylinders operated by cams. Right-angle drive attachments, to take side and face milling cutters, are available for mounting on the vertical spindle heads, to which power feeds can be applied downwards and horizontally. (MACHINERY, 93—19/11/58.)

Italian Machine Tool Exhibition, Milan P. 1177

Some 530 firms, occupying stands covering a floor area of about 270,000 sq. ft., participated in the first exhibition organized by the Italian Machine Tool Builders Association (Unione Costruttori Italiani Macchine Utensili), and held in Milan from September 12 to 21. The majority of the equipment demonstrated was of Italian manufacture but there was a representative selection of other Continental, British and American machine tools. Reference is

made in this article to Zocca cylindrical and surface grinding machines, Maxnovo hydraulic copying lathes, Mannaioni high-speed threading lathe, Rigiva milling machines, and a Federici combined ultrasonic and spark-erosion machining unit. (MACHINERY, 93—19/11/58.)

New Techniques for Grinding Sintered Carbides P. 1186

Encouraging results have been obtained from experiments with two new techniques for grinding sintered carbide materials, such as those employed for cutting tools. It has been found that by raising the temperature of the tool to between 750 and 850 deg. C. prior to grinding, and maintaining it at this temperature during the operation, these materials can be ground satisfactorily and rapidly with standard corundum or silicon carbide wheels, and with a complete absence of craze-cracking. This method is particularly intended for rough grinding, where large amounts of stock must be removed as, for instance, when reclaiming a badly damaged tool. Finish grinding is carried out by an electrolytic method, with a metal-bonded corundum wheel. Iron powder is used as the binder, and is sintered with the abrasive in ratios from 1:1 to 1:3, by weight. (MACHINERY, 93—19/11/58.)

Dawson Universal Milling Arbor...P. 1194

Edward Dawson (Engineers), Ltd., Church Avenue, Sawley, Near Long Eaton, Nottingham, have recently introduced a universal milling arbor, known as the Uni-Arbor, which is suitable for use on all machines incorporating any of the standard spindle nose tapers. Cutters ranging from $\frac{1}{8}$ -in. diameter to large face cutters can readily be set up on a "base-arbor" by the use of interchangeable "inserts," either individually, or in various combinations. Similarly, cutter-gangs can be set up or removed from the machine as self-contained units, by the use of a special cutter-arbor for horizontal milling machines. Boring bars, designed for mounting in a similar manner, are also available. Some typical simple and "compound" cutter set-ups are described and illustrated. (MACHINERY, 93—19/11/58.)

Contributions to MACHINERY

If you know of a more efficient way of designing a tool, gauge, fixture, or mechanism, machining or forming a metal component, heat treating, plating or enamelling, handling parts or material, building up an assembly, utilizing supplies, or laying out or organizing a department or a factory, send it to the Editor. Short comments upon published articles and letters on subjects concerning the metal-working industries are particularly welcome. Payment will be made for exclusive contributions.

IN FORTHCOMING ISSUES

Producing the Vauxhall Victor—Combined research to improve performance on multi-spindle automatics.

A Surplus of Steel

Additions to productive capacity have enabled outputs of pig-iron and crude steel to be substantially increased during recent years to meet a steadily rising demand. For the period from 1951 to 1957, progress in this field was uninterrupted and it may be noted that the weekly average output of pig-iron advanced from 186,000 tons in 1951 to 225,000 tons in 1954, and 275,000 tons in 1957. For crude steel the corresponding figures were 301,000, 356,000, and 417,000 tons respectively. Despite the considerable growth in production, quite substantial imports were necessary during the period to help to satisfy the needs of industry and, even so, various users were frequently hampered because they could not readily obtain adequate supplies. It was noteworthy, too, that the imports fluctuated considerably in accordance with the prevailing relationships between home supplies and demand. Under the heading "pig-iron and sponge iron," for example, imports rose from 301,000 tons in 1951 to 732,000 tons in 1952, fell to 339,000 tons in 1954, increased again to 673,000 in 1955, and by 1957 had dropped to 320,000 tons.

When imports of "iron and steel" in various forms are considered collectively the figures are even more striking, but in this connection it must be borne in mind that imports at various stages during the period may have been stimulated by lack of processing capacity for certain forms of material rather than by absolute shortage of steel. The tonnage under this heading for 1951 was 883,000, for 1952, 2,457,000, for 1954, 764,000, for 1955, 2,318,000, and for 1957, 1,285,000. Since much of this material was partially or fully processed, the value of these imports was necessarily high and for 1954 the total was £125 million, and for 1956, £106 million. For purposes of comparison it may be noted that in 1952 exports of "iron and steel" were valued at £192 million, and in 1956 at £173 million.

This year there has been a drastic change in the situation. During the first quarter the output of pig-iron fell slightly, as compared with the 1957 average, to 271,000 tons per week. For the second quarter the average was about 251,000 tons, and for the third quarter 226,000 tons. Over the nine months the weekly average was thus about 249,000 tons, and in relation to the average for the full year 1957 this represented a reduction of output of more than a million tons. Output of crude steel continued the upward trend during the first quarter, and the weekly average for the

period was approximately 429,000 tons. In the second quarter, however, the average fell to 389,000 tons, and in the third quarter to 327,000 tons. During the nine months, therefore, the average figure was 382,000, and without making any allowance for the further increases in productive capacity that have taken place, there was a loss over the period, in comparison with the full-year average for 1957, of some 1,365,000 tons.

Imports of "iron and steel" from January to September amounted to 641,000, valued at £40 million, as against 989,000 tons, valued at £59 million in the corresponding period of 1957. At the same time there was a fall in exports for the nine months from 2,375,000 tons, valued at £159 million, in 1957 to 2,004,000 tons, valued at £138 million this year. It will be apparent, therefore, that the declines in imports and exports approximately balanced in both tonnage and value. Consequently, the reduction in output must be attributed almost entirely to lessened demand from industry at home, despite the very high level of activity that has prevailed in certain branches.

Iron and steel have become such vital factors in both the internal and external trade of the country—the consumption of steel per head of population may reasonably be regarded as a measure of the standard of living—that we can ill afford to allow productive capacity to lie idle. As has been indicated, there have been frequent shortages in recent years which have adversely affected the consuming industries, and it is not unreasonable to suppose that when the general expansion of manufacturing activity is resumed, there might be a rapid transformation from abundance to dearth. In the circumstances it might be argued that there would be considerable justification, from the national standpoint, for building up substantial stocks, particularly in view of the durable nature of these commodities. At present day costs, however, individual producers cannot be expected to hold stocks beyond certain limited levels. According to the figures contained in the Monthly Digest of Statistics, stocks of pig-iron at steel works, steel foundries and blast furnaces rose from 1,039,000 tons at the end of 1957 to 1,152,000 at the end of September, and this latter total represented only about five weeks' production at the rate then prevailing. Similarly, there have been only very modest increases this year in the stocks of crude and semi-finished steel, according to the latest figures presented.

Production of Cash Registers and Accounting Machines



**Methods Employed by the
National Cash Register Co.
(Manufacturing), Ltd., Dundee**

In articles already published in *MACHINERY*, 93/692—24/9/58, and 93/804—8/10/58, concerned with manufacturing techniques developed by the National Cash Register Co. (Manufacturing), Ltd., Dundee, some interesting set-ups have been described for the production of shaft components, deburring and barrel finishing, broaching, riveting, cam and profile milling, hardening and brazing, and high-speed milling, also applications of a number of special-purpose automatic machines for drilling and reaming. Attention has been drawn to the very large number of different components that must be handled in batch quantities of widely varying size, the adding machine seen in the heading illustration, for example, containing a total of some 4,300 parts. This aspect has necessitated careful consideration in the development of methods which ensure efficient production, with economic tool costs, and permit rapid changing of set-ups. Other production methods are here described, and some details are given of the company's policies with regard to component inspection and preventive maintenance in the machine shops.

MACHINING FRAME CASTINGS

The various milling, drilling, reaming, and tapping operations required on cast-iron bases and frame components for accounting and adding

machines, and cash registers, are carried out in a section, specially equipped for the purpose, adjacent to the main assembly line in the Camperdown factory. This arrangement has been adopted to facilitate the movement of work, particularly the larger castings used in accounting machines, also to keep these somewhat dirty operations on cast iron away from the main machine shop on the nearby Industrial Estate.

Of particular interest in this department are three American-built Natco multi-spindle hydraulic-feed drilling machines, two of which, shown in Fig. 1, are connected by jig guide rails and are used for carrying out drilling and reaming operations on the base castings for the Class 31 accounting machines.

A close-up view of the workpiece loaded into the jig is given in Fig. 2. Drilling operations are first performed on the machine at the left, and the jig, which is mounted on rollers, is then moved, by hand, along the square-section guide bars A, Fig. 1, to the second machine, where certain holes are reamed or counterbored. The workpiece is held in the jig by a series of hand clamps, and the drills, reamers, or counterbores are guided in a bush plate, as at B Fig. 2, which slides on four guide pillars on the spindle head and is located at the working position by two large-diameter dowels C, on the jig.

Fig. 1. Arrangement of the two large Natco multi-spindle machines, connected by jig guide rails, employed for drilling, reaming, and counterboring operations on cast-iron frames

A total of 95 holes is drilled in this accounting machine base, and the operation is carried out in two stages, on batches of work, with interchangeable multi-spindle heads. No coolant is employed, and standard high-speed steel reamers are used. The cycle time for the first stage is 6 min., and for the second stage 6½ min. Limits of ± 0.001 in. are specified for hole centres, and $+0.001 - 0$ for the diameters of reamed holes.

Another large Natco multi-spindle machine, of similar design, is installed for operations on right- and left-hand cast-iron side frames, which are handled separately, with interchangeable spindle heads. The jig on this machine is arranged to index transversely, to four drilling positions, to produce the required hole pattern, and safety switches are fitted which prevent the drilling cycle being started unless the jig is correctly located.

Milling machines installed in this department include Cincinnati duplex and single-spindle production types, and very satisfactory results are also obtained with Pratt & Whitney, Asquith, and Morey machines, normally designed for 1 to 1 ratio profile milling from a template, under hand control. After removal of the stylus pins, these machines can be readily used for rapid light-duty milling operations on the numerous bosses and facings provided on the types of castings handled. Tungsten-carbide tipped cutters are extensively employed for these operations. Single-spindle pillar drilling machines, arranged in multiples up to six, are installed for drilling, reaming, tapping, and counterboring operations on the smaller



types of castings, which are held in box-type jigs.

OPERATIONS ON NUMBER WHEELS

Shown at *D* and *E* in Fig. 3, are two examples of number wheels, or indicators, used in National

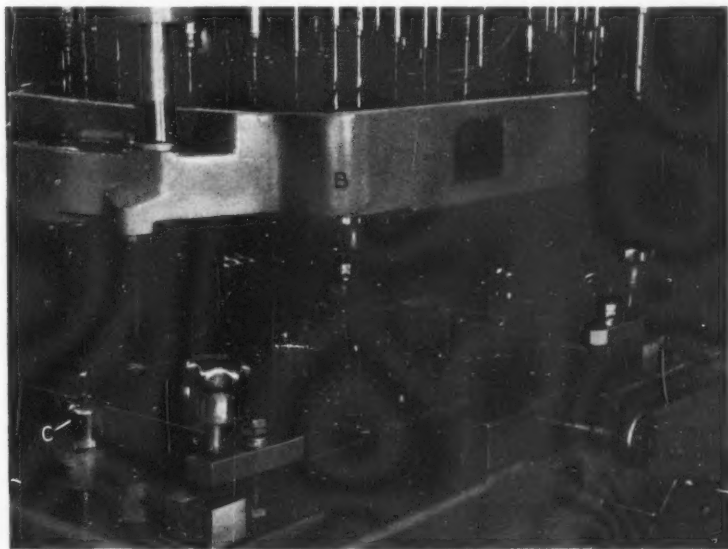


Fig. 2. Close-up view of the jig, with a casting in position, on the Natco multi-spindle drilling machine

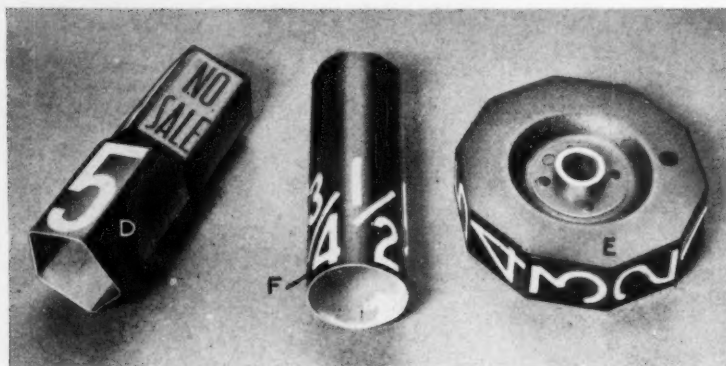


Fig. 3. Typical printed number indicators incorporated in National cash registers are shown at *D* and *E*

cash registers, the part *E*, comprising a multi-sided pressing of 0.016-in. thick aluminium, to which is riveted a flanged centre boss. The component at *D* is produced from aluminium tube of approximately 1½ in. diameter by 0.016-in. wall thickness, and the numbers are marked on the periphery, as shown at *F*, before the staggered flats are formed at the ends. The part shown has five flats, and there are similar numbered components with six staggered flats at the ends.

Round tubes for the part *D* are first given a white surface on a Dawson, Payne & Elliott roller-coating machine. The numerals and letters are then produced by offset printing on the Dawson, Payne & Elliott offset printing machine shown in Fig. 4, which was specially designed for this type

G of a 3-station indexing carrier, and is removed at station *H*, after it has been printed by contact with the ink band on the continuously rotating disc *K*.

Staggered flats are produced on the printed tube by means of the air-operated tool shown in Fig. 5. This tool incorporates a centre mandrel, on which the workpiece is loaded, as seen at *L*, and pushed up to a rear stop within the head *M*. The tube is a loose fit on the mandrel, and the flats are formed by the stretching action applied by two sets of staggered, radial blades, as at *N*, which are moved outwards by an air cylinder at the rear. The required blending of the flats at the centre of the tube is effected by blades carried in the head *M*, which are moved radially inwards, to bear on the periphery of the tube, by means of an air cylinder *P*.

Numbers in white on the periphery of the component *E*, Fig. 3, are produced by the screen printing method, on a dark brown background, which is applied first by spraying. The latter operation is carried out in the adjacent paint finishing shop with the portable unit seen in Fig. 6, which is wheeled into position in a Bullows waterwash spray booth. The workpieces, as seen at *R* and *S*, are loaded on to mandrels, which are supported by outer tailstocks and coupled to a

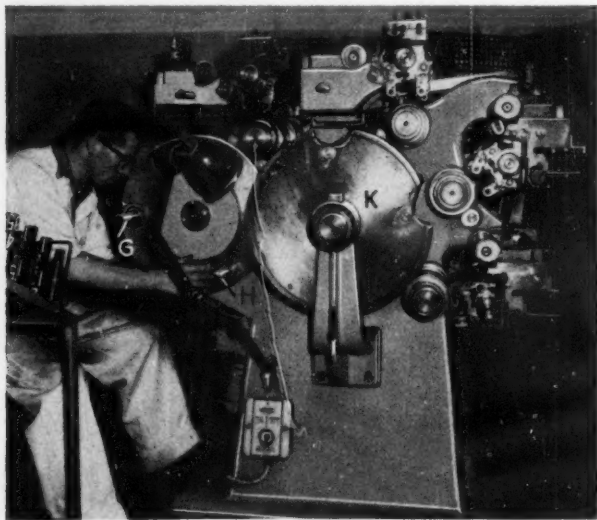


Fig. 4. Dawson, Payne & Elliott offset printing machine for cash register number indicators

driving head *T*, at the centre, whereby they are rotated continuously at a slow speed.

The driving motor also rotates a screw *V*, provided with combined right- and left-hand threads of coarse pitch which are engaged by a round pin projecting from the underside of a carriage *W*. The latter moves along two round guide bars and carries a standard spray gun, which is held by a clamping arm. Mounted on a flat bar *X*, pivoted at the left-hand end, are two cam plates *Y* and *Z*, which control the opening and closing of the spray gun valve. Spraying is carried out at two passes, from right to left, and back, and the carriage motion is reversed automatically at the left-hand end by the action of the threads on the screw. When the gun has returned to the starting position, the operator switches off the driving motor and releases a latch on the right, which allows the pivoted bar *X* to retract under spring pressure, and the spray gun valve to close. The gun is started by pulling the bar forward into engagement with the latch, and during the carriage traverse the valve is closed by the cam plates as the gun traverses past the centre driving bracket for the mandrels.

Stoving is carried out with the workpieces clamped on the mandrels, which are handled in groups of four, mounted in a special holder. Equipment in the finishing shop includes two Ballard conveyORIZED stoving ovens, as shown in Fig. 7, for handling work with smooth and wrinkle finishes. In this connection, it may be noted that glass fibre is now being employed for certain covers and panel components, particularly for accounting and adding machines, with the object of reducing noise in operation.

Fig. 8 shows a bench-mounted automatic machine which has been designed and built by the company for screen printing, in white, the numbers on some 20 different components of the type seen at *E* in Fig. 3. A stainless steel screen, of 400 mesh is employed, which enables a heavier coating of paint to be applied than would be possible with a normal silk screen, and has longer life.

Fig. 6. Automatic spray painting unit for applying the undercoat to cash register number indicators

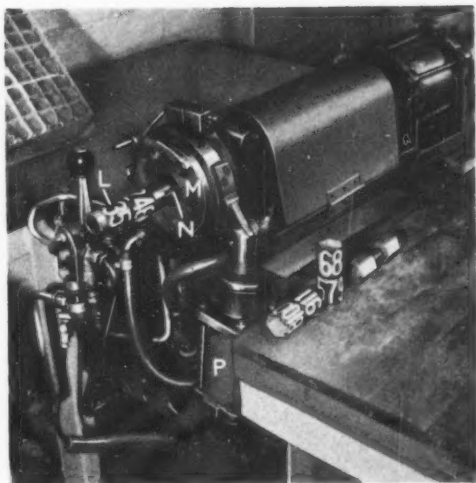
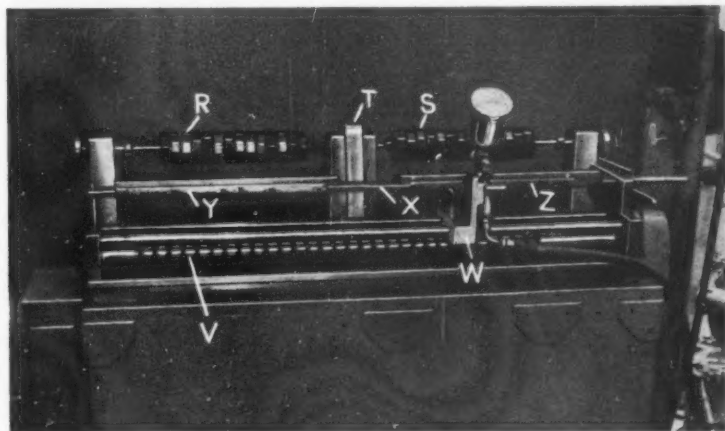


Fig. 5. Air-operated bench machine employed for forming the staggered flats on each end of number indicators of the type seen at *D* in Fig. 3

A component is located on an indexing spindle at *A*, immediately below the screen, to the top surface of which paint is applied periodically. The screen is retained in a frame *B*, pivoted along its rear edge on a roller carriage *C*, which is indexed automatically from right to left along guide rails *D*. This indexing motion takes place in unison with the rotary indexing of the work spindle, to bring the numbers formed by the mask on the screen into position, in turn, over the workpiece flats. It is effected by a ratchet mechanism driven by a motorized variable-speed unit at *E*, the ratchet



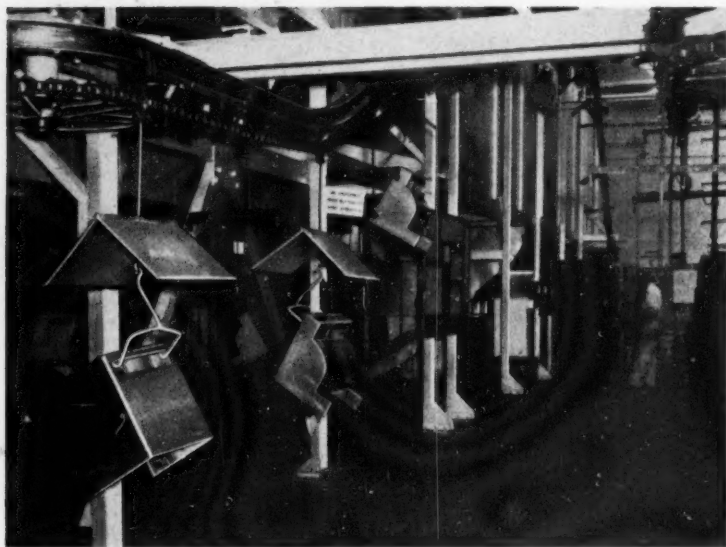


Fig. 7. A view of one of the Ballard conveyor stoving ovens in the paint finishing shop

wheel being attached to a pinion on the work spindle, which meshes with a rack secured to the carriage.

When the screen and workpiece have been indexed, the number is marked by the action of a rubber roller which is carried on a spring-loaded, pivoted arm in a reciprocating holder, and bears on the top of the screen and the work. The holder is actuated independently, by a link, from the driving unit, and moves in a guideway on the machine frame. An outboard support roller on the arm bears on the top edge of the frame. Upon

completion of a forward and a backward stroke, the pivoted frame *B*, together with the roller, is raised clear of the work by means of a cable *F*, coupled to a link on the driving unit. Indexing of the screen carriage and work then takes place, and the screen is lowered again in preparation for the next stroke. When the printing operation has been completed, the machine is stopped by means of a trip switch, with the screen raised, and a detent is released to allow the carriage to return to the starting position under the action of a weight suspended from a wire cable *G*. On this machine, 120 number wheels can be marked per hour.

PRECISION GRINDING OPERATIONS

Grinding plays an important part in the production of many components on which close limits must be maintained, and in the well-equipped

section devoted to this work the machines installed include Churchill Fulcro-Sizer and Jones & Shipman cylindrical grinders; Snow and Jones & Shipman No. 540 surface grinders; a Cincinnati centreless grinder fitted with a Feedmatic hopper unit for handling a variety of shaft components; an

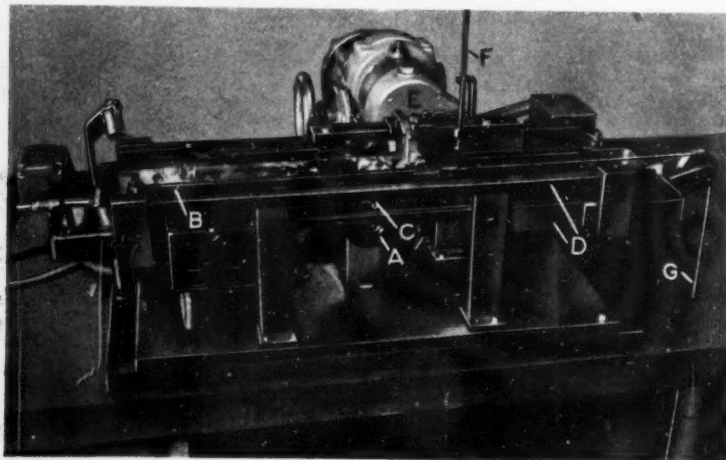
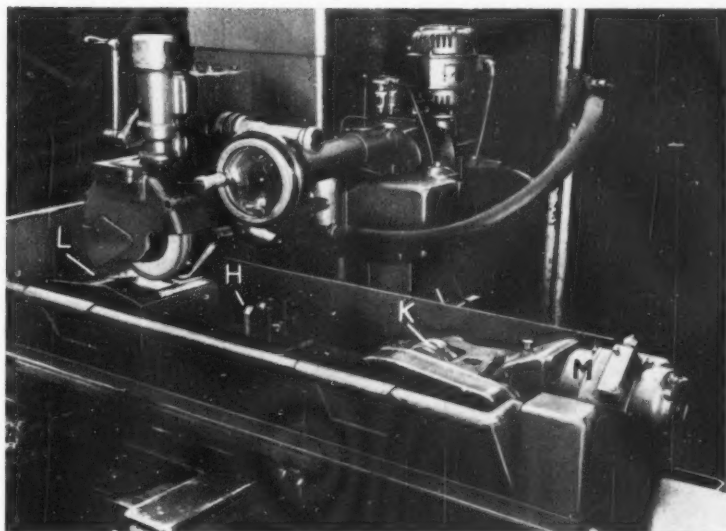


Fig. 8. This semi-automatic machine was developed by the company for screen printing number indicators

Fig. 9. Jones & Shipman Fig. 1012 surface grinder equipped for form grinding by the crushed grinding by the crushed wheel method



American-built Jones & Lamson thread grinder; and two Jones & Shipman Fig. 1012 surface grinders with wheel crushing equipment, for operations on profiled parts. In this grinding section, Philips coolant clarifiers are extensively employed to ensure a high standard of surface finish on the work.

On the Jones & Shipman formed-wheel surface grinders some 16 different parts are handled, and one of these machines is seen in Fig. 9 set up for carrying out a form grinding operation on the 0.505 and 0.030 in. radii on the latch plate shown in Fig. 10, which is incorporated in the National Class 21 cash register. This component is produced on a press from 0.080-in. thick cold-rolled mild steel, and after blanking and piercing, the entire outline is shaved, leaving sufficient material on the 0.505, 0.030, and 1.031 in. radii to permit them to be finished by grinding. The shaved blanks are copper plated to provide for local hardening at a later stage, and the 1.031 in. radius is then ground on a Churchill cylindrical grinder, with the parts located by the 1/2 in. bore, and clamped six at a time on a mandrel.

For the form grinding operation on the Jones & Shipman machine, Fig. 9, the blanks are held, six at a time, on the fixture *H*, by means of a clamp bar tightened by a hand nut, and location is provided by two pins which enter the 1/2-in. and 3/8-in. diameter holes. Approximately 0.005 in. is removed from the form, using a Carborundum AA.220.L5 wheel, and the output is 85 pieces per hour.

The parts are next carburized, hardened, and inspected, and a hub and a stud component are then flush riveted in to form the assembly shown in Fig. 11. After the assembly operations, the face of the hub is surface ground on one of the Snow machines, and the 1.031-in. radius is finished to 1.028 ± 0.0004 in. on a Jones & Shipman cylindrical grinder, four workpieces being handled at a

time. Finally, the previously ground latch radii Fig. 10, are finish form ground to 0.500 in. and 0.025 in. using the same set-up on the Jones & Shipman machine, Fig. 9, but with the parts located, two at a time, by the hub bore and the stud at a separate station on the right of the fixture.

In Fig. 9, the working crushing roll, which is used periodically for forming the grinding wheel, is seen at *K*. It is carried in a unit on the right of the machine table, and rotates idly when the wheel is being crushed. An idly-rotating master

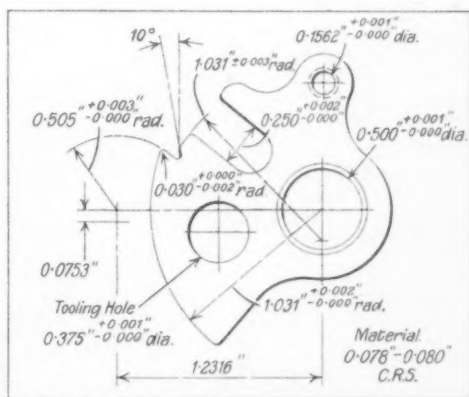


Fig. 10. The steel latch plate here shown is form ground on the Jones & Shipman machine seen in Fig. 9

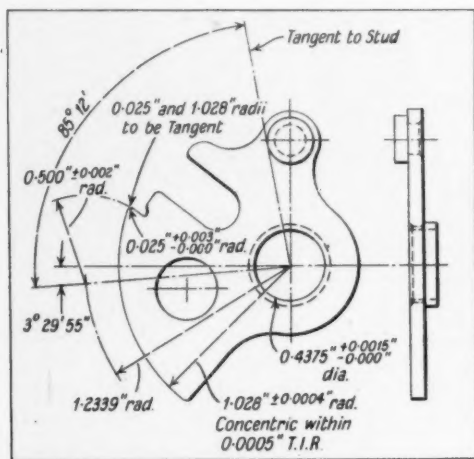


Fig. 11. The latch plate after assembly of the centre hub and the stud

Following another straightening operation, one side face of the bar is surface ground on a Snow machine to reduce the stock thickness to 0.088 in., and straightening is again carried out. The five 0.130-in. wide slots are next pierced on a Rhodes No. 3, 75-ton geared press, and are deburred in a Kerry sensitive drilling machine, using a standard $\frac{1}{2}$ in. rosebit reamer. Before the opposite face of the bar is surface ground to produce the finished thickness of 0.080 in., a straightening operation is performed, and, after face grinding, the bottom edge is ground square, to produce a width of 0.535/0.537 in. The sharp edges are removed on an abrasive belt machine.

The 0.080 in. radii on the opposite edge of the bar are first rough formed by milling, and the finish grinding operation is then carried out on two workpieces at once, clamped side by side with a spacer between. Two formed grooves are crushed in the grinding wheel, which is of grade AA.150.LV., and the output obtained is 16 pieces per hour. Upon completion of this operation, the parts are placed in special trays to avoid damage to the ground surfaces, and are then subjected to an inspection operation, before they are nitrided to produce a hard wearing surface. Straightening is again carried out after heat treatment, and the parts are then dipped in a rust preventative before being delivered to stores.

Fig. 13 shows another Class 31 accounting machine component, which is form ground, by the crushed-wheel method, on the hook surfaces to the dimensions in the sectional view. Known as a printer trigger, this part is produced from mild-steel drawn section material supplied by John Rigby & Sons, Ltd., and after preliminary milling, deburring, straightening, and turning operations, it is

roll is provided in the housing *L*, at the opposite end of the table, and is employed to crush the wheel accurately to form in preparation for re-grinding the work roll when the latter becomes worn. For this operation, the working roll is driven at a suitable slow speed by the motor at *M*.

Another component, known as an aligning bar, which is handled in appreciable quantities and requires to be form ground, is shown in Fig. 12. It is incorporated in the National Class 31 accounting machine and is made from $\frac{1}{2}$ -in. wide by 0.108-in. thick nitriding steel strip. Pieces, 10.925 in. long, are first sawn off on a Cincinnati 1/18 milling machine, and after the burrs have been removed from the ends, using an abrasive band machine, one hole of 0.125 in. diameter is pierced for jig location purposes. Next, the bars are straightened by serration planishing in a Bliss 400-ton press, and they are then hardened and tempered to produce a toughened core. Scale resulting from the heat treatment is removed by Roto-Finish barrel finishing, with the parts loaded in layers.

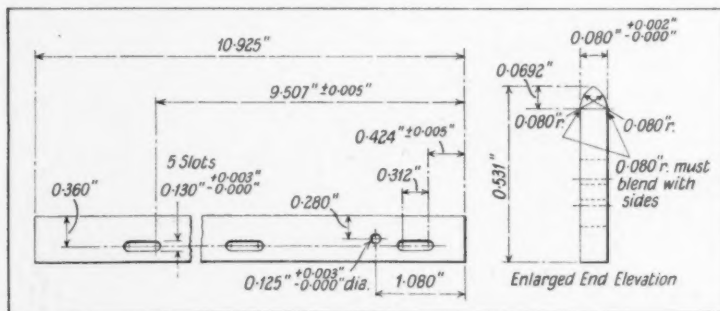
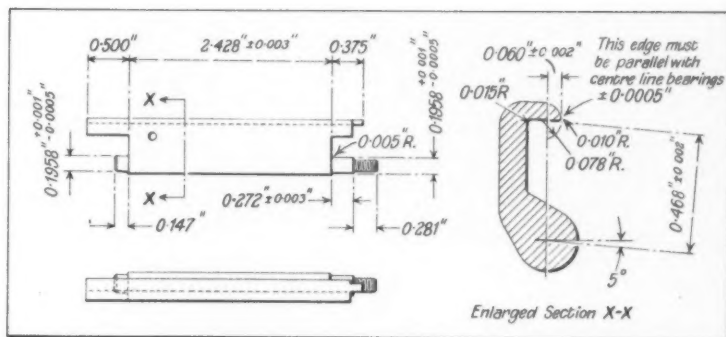


Fig. 12. Steel aligning bar, for a National Class 31 accounting machine, which is form ground on the Jones & Shipman machine

Fig. 13. Component produced from drawn steel section which is subsequently profile-ground on the Jones & Shipman machine to the dimensions indicated in the sectional view



copper plated and rough milled on the stepped latch face, and then locally case-hardened on the surfaces which are subsequently to be form ground. The latter operation is carried out on one work-piece at a time, in two passes, and the time required per piece is about 10 min.

The end spigots of this component, it may be noted, are turned to a tolerance of 0.0015 in. on a Herbert capstan lathe. For this operation, the work is located and clamped in an indexing fixture, so that both ends can be located at the subsequent form grinding operation, and limits of ± 0.0005 in. for parallelism are maintained. All the turning and threading operations are carried out from the turret of the Herbert machine, and the rough turning operation on the spigots is performed with a high-speed steel hollow mill. Special projecting chasers are used in the Coventry die head for cutting the $\frac{1}{8}$ -36 thread. A balance weight is fitted on the back plate of the fixture, and is moved from one position to another, by the operator, when the work holder is indexed, to ensure smooth running of the machine spindle. Including inspections at various stages, some 50 operations are required to produce this trigger component.

The Churchill Fulcro-Sizer cylindrical grinder, mentioned above, is employed principally for finishing small shafts to close tolerances, and a typical set up is shown in Fig. 14. This machine operates on a fully-automatic cycle, and an important feature

of the design is that grinding is carried out by tilting the table towards the wheel instead of feeding the wheel to the work. The tilting movement is imparted to the table by an electro-hydraulic control unit, whereby a gradually decreasing feed is applied until the sizing position is reached, and, at this stage, the table can be arranged to dwell, if desired. Upon completion of grinding cycle, the hydraulically-operated tailstock barrel is retracted, leaving the finished piece supported in a loading cradle, ready for removal by the operator. A fresh piece is then placed in the cradle, and the automatic cycle is started by movement of a control lever. Tolerances on diameter of less than 0.0002 in. can readily be maintained on long runs of components, with a surface finish of 3 micro-inches, when removing 0.010/0.012 in. on

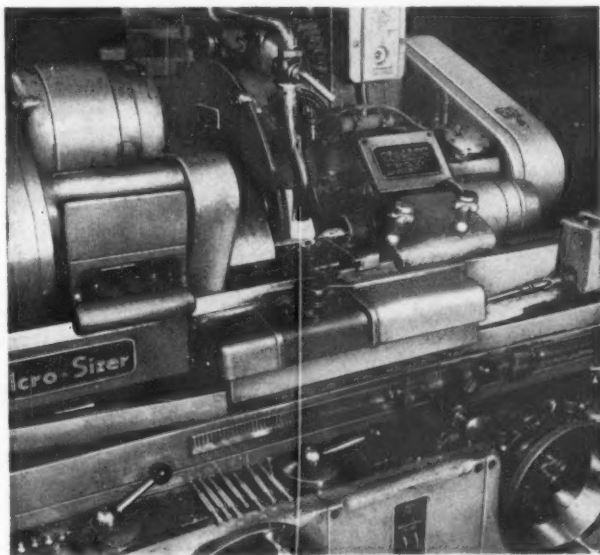


Fig. 14. Churchill Fulcro-Sizer cylindrical grinder installed for handling a variety of shaft components

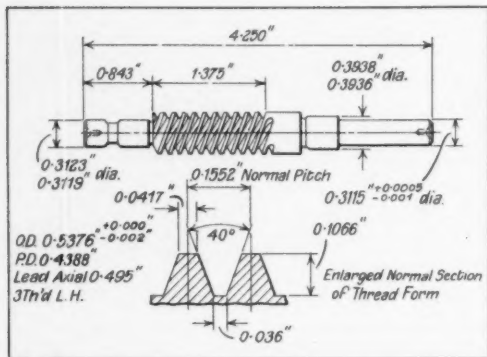


Fig. 15. Thread-ground driving worm shaft for the National Class 31 accounting machine

diameter. A Sigma mechanical comparator is provided, on which the operator checks the work produced. The machine is also employed for light-duty form grinding operations on certain radiused and tapered components. For this purpose, the profile is produced on the wheel periphery by crushing with a gashed roller carried on a mandrel which rotates idly between the machine centres while in-feed is applied.

Among the workpieces handled on the Jones & Lamson type TG615 thread grinder are the two main driving worm shafts shown in Fig. 15 and 16, for the Class 31 accounting machine, and an adding machine, respectively. In Fig. 17, the TG615 machine is seen set up for grinding the smaller worm (Fig. 16). Both worms are produced from cold drawn, stress-relieved, high-tensile steel bar, which is not subsequently heat treated, and the

threads are ground from the solid. Each worm has three starts, and is ground in several passes. For the large worm, a total of six passes is taken, the first of which removes 0.090 in. on diameter. Four passes, each removing 0.030 in. on diameter, are then made, and before the final pass (of 0.010 in.) the single-rib wheel is dressed with a diamond. The grinding and dressing cycle is performed automatically, but the work is indexed by hand for producing the three starts. The floor-to-floor time for grinding this worm shaft is 12 min. For the smaller worm shaft, four passes, removing 0.060, 0.020, 0.020, and 0.008 in. on diameter are taken, and the floor-to-floor time is 9 min.

On the Jones & Lamson machine, the work-head and tailstock are clamped to the bed at the required distance between centres, and the thread pitch produced is controlled by a master lead screw and nut at the rear of the headstock, which traverses the work spindle quill. Grinding takes place on both the forward and return strokes of the work, wheel-head infeed being applied at the end of each stroke, and during the traverse motion the tailstock barrel advances and retracts.

The work is located between centres, and rotated by means of a driving dog. Work spindle speeds from 8 to 160 r.p.m. are available, the speed employed for the large worm shaft being 8 r.p.m. and for the small worm shaft, 11 r.p.m. Rapid approach and in-feed of the grinding head is obtained mechanically, and the movements of the motor-driven wheel dressing diamond are controlled by cams. The speed of the grinding wheel is steplessly variable from 1,000 to 3,000 r.p.m. by rheostat control, and when dressing is being carried out, the speed is automatically decreased to reduce wear on the diamond. Wheel crushing equipment is also incorporated, and, if desired,

thread grinding can be carried out with multi-ribbed wheels. Provision can be made for grinding in one direction of work traverse only, with rapid return to the starting position.

A 20-in. diameter Norton 38A/120 Alundum wheel is employed for worm grinding, and the coolant is Duckham No. 5447 cutting oil. A Hilger optical projector is provided for checking the thread form produced, and the diameter is measured, by

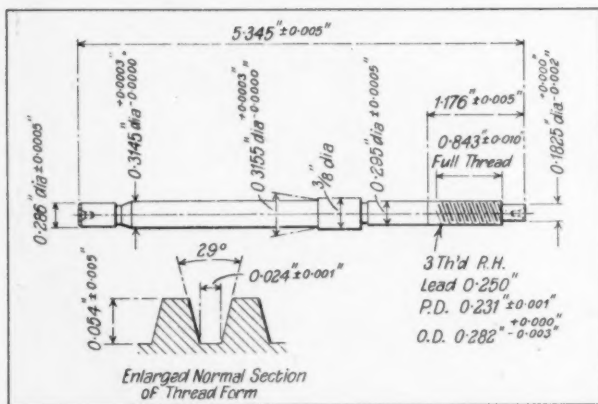
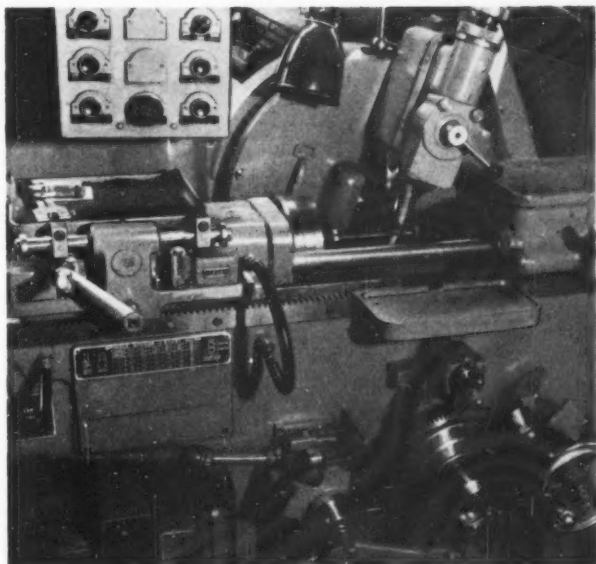


Fig. 16. Driving worm shaft for a National adding machine

Fig. 17. Jones & Lamson thread grinder set up for producing the threads on the adding machine worm shaft shown in Fig. 16



means of wires, on a Sigma instrument with the work mounted between centres.

SPRING MAKING

The company now has extensive facilities for producing the many types of light springs incorporated in cash registers, and accounting and adding machines. Various kinds of extension, compression, and torsion springs are made from wire ranging from 0.006 in. to 0.080 in. diameter, for which purpose machines by Bennett Tools, Ltd., also No. 0, No. 1, and No. 1½ Sleeper & Hartley machines of U.S. design, are installed (the No. 0 machine being now made in this country by Bennett Tools, Ltd.). In an adjacent section, there are hand-operated bench fixtures for forming the eyes and carrying out other finishing operations on the ends.

One of the British-built Sleeper & Hartley machines in the spring making section is shown in Fig. 18. Comaco spring testers, supplied by Coats Machine Tool Co., Ltd., are mounted on cabinets adjacent to the machines, and enable the operators to maintain a check on the work produced. In the inspection department, Hunter spring testers of U.S. design are also employed. It is the practice to stress relieve compression springs after the coiling operation, and for this purpose they are held at a temperature of 500 deg. F., for 30 min. in a Funditor electrically-heated oven.

INSPECTION PROCEDURES

With the inspection procedure that has been established in the machine shops, no patrolling inspectors are employed, and provided that a particular manufacturing method has been proved satisfactory, the production of good work is largely the responsibility of the operator and the machine setter or section supervisor. For this reason, gauging facilities adequate for the purpose are provided at the machines, and when setting the piece work rates, time is allowed for checking.

All batches of work pass through a main inspection department and both the shop and the inspec-

tion gauges are made to the component drawing tolerances. It is not the practice to issue shop gauges of a closer tolerance than that which is acceptable, as a means of maintaining quality. On many components, all the machining operations

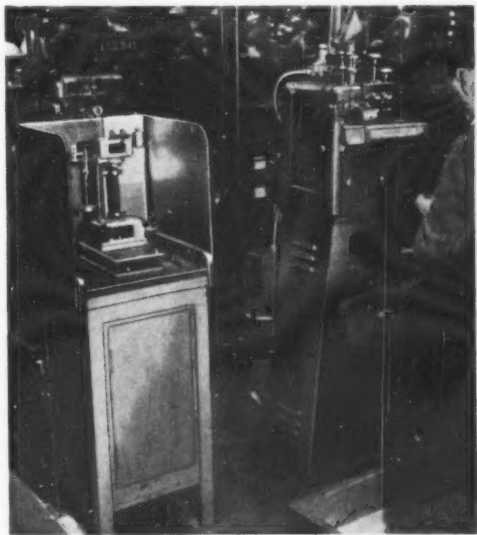


Fig. 18. One of the British-built Sleeper & Hartley machines in the spring-making section

AN EXAMPLE OF THE TABLES EMPLOYED FOR THE SAMPLE INSPECTION SYSTEM									
Acceptance Sampling Table				A.O.Q.L. = 2.5 per cent					
Double Sampling	Normal			Tightened			Reduced		
Lot Size	S	C	S2 C2	S	C	S2 C2	S	C	S2 C2
1-10	All	—	— —	All	—	— —	All	—	— —
11-50	11	0	— —	11	0	— —	11	0	— —
51-200	20	0	12 1	25	0	35 2	20	0	12 1
201-400	25	0	35 2	30	0	60 4	20	0	12 1
401-1,000	28	0	47 3	60	1	115 8	27	0	33 2
1,001-4,000	36	0	94 5	95	2	210 13	27	0	33 2
4,001-10,000	65	1	140 8	220	6	410 24	27	0	33 2
10,001-20,000	70	1	170 9	245	6	610 30	27	0	33 2
20,001-50,000	100	2	195 11	360	10	830 43	27	0	33 2
Over 50,000	105	2	245 13	415	11	1,145 54	27	0	33 2

S = 1st sample. S2 = 2nd sample. C = Defectives allowed in 1st sample. C2 = Defectives allowed in 1st and 2nd samples combined. (Derived from Dodge and Romig Sampling Tables.)

required are completed before the batch is inspected, but all work is inspected immediately before and after heat-treatment, and other similar processes. Inspection of surface finish, where it is important, is performed by means of a Profilometer instrument in the inspection department, to which machine setters and charge hands have access, and with polished surfaces, for example, visual comparison is made against accepted samples.

As previously explained, at any one time, a large number of batches of different components is being produced, and in many instances, the batch quantities are relatively small. Quality control by chart methods at the machines is therefore not always practicable, and is mainly employed, for investigation purposes, on long runs of components.

As with jigs, press tools and fixtures, all gauges returned to stores are checked in a section specially provided for the purpose, before they are accepted for re-issue, and gauges in constant use in the shops are inspected periodically according to a date card system. Gap gauges for external measurement are usually of the solid type. In the design of components for the company's products, standard hole sizes are specified wherever possible, and the plug gauges provided for checking purposes do not carry tool numbers, and are withdrawn from use at intervals, for inspection. The standard limits on reamed holes are $+0.001$ in. - 0, and on drilled holes, $+0.003$ in. - 0. The centre distance of jig-drilled holes and pierced holes must usually be held within ± 0.001 in.

An appreciable number of components is in-

spected on a 100 per cent basis, but the majority are handled by a sampling system, using Dodge and Romig tables. These tables are so compiled as to ensure that faulty parts delivered to stores do not exceed a specified percentage of the batch, and four average outgoing quality levels (A.O.Q.L.) have been established, namely 0.5, 1.0, 2.5, and 5 per cent. The accompanying table relates to the 2.5 per cent A.O.Q.L., which is the one in most common use. It will be noted that provision is made for three grades of inspection on each card, namely, normal, tightened, and reduced, and the grade to be employed is specified by the inspection department. The method of application can readily be explained by considering, for example, batch quantities ranging from 4,001 to 10,000, which are to be checked to the normal grade. A first sample of

65 pieces, taken at random, is inspected, and if there is only one reject the entire batch is accepted. Should there be more than one reject, but less than eight, the sample of 65 that has been taken is retained and another 140 pieces are taken. These additional parts are inspected, and if there are eight or less rejects in all, the batch is accepted. The entire batch is rejected if more than eight rejects are found. These sampling tables are printed in quantity on pocket-size, $3\frac{1}{2}$ by 2 $\frac{1}{4}$ -in. thin cards in four distinctive colours, according to the percentage A.O.Q.L., and to withstand shop conditions, each card is enclosed between two sheets of clear plastics material.

For each component, the sequence of manufacture is indicated on the batch progress ticket, and, in addition, for every operation, there is an instruction card, giving detailed information relating to methods, which is held in the machine section concerned. Following the same procedure, inspection instructions cards are compiled which specify checking methods and gauges to be used, and draw attention to any particular requirements, for example, for straightness or surface finish, that have been found necessary from previous experience.

Permanent record cards for each inspection stage for the majority of the different components are also maintained, and are filed in the statistical quality control section of the inspection department. The information entered on these cards includes the quantity in each batch, the date submitted for inspection, the numbers of parts accepted and rejected, the types of rejects found in the

samples taken, and various other details which will facilitate the control of quality. On the reverse side of the card there is provision for making, periodically, an analysis in tabular form of the detailed information compiled on the various batches of work. From this analysis it can be decided whether the inspection procedure can be "reduced," or, on the other hand, whether a "tightened" level of sampling is necessary. These cards are also useful for tracing the history of any components which cause trouble in the assembly shop.

All known scrap components—including setting scrap—are kept separate by the manufacturing section, and are delivered to the inspection department along with the batch of work. This arrangement ensures that the scrap can be properly discarded, and that known rejects do not become mixed with the batch, and inadvertently selected when taking a sample for inspection. The inspection department is responsible for allocating the charge for scrap against the appropriate machine section, also for specifying any additional operations that may be required to rectify rejects.

PREVENTIVE MAINTENANCE

The company is fully aware of the importance of scheduled plant maintenance as a means of obtaining economic flow production, and during the past two years a system has been progressively establishing to cover the machine shops. This phase is now practically completed, and it is intended to apply the same procedure to other factory and office equipment, and to buildings and services.

Inspection and maintenance schedules covering 1-, 3-, 6-, and 12-month periods have been compiled for all the machine tools in the plant, and in each section large wall boards are provided, which list, under their plant numbers, all the machines installed, and indicate the weeks during the year when

they must be made available to the plant department for maintenance. The inspection and maintenance procedures to be followed for the various types of machines are specified on instruction sheets issued to the plant electrical and mechanical departments. In general, it is arranged, as far as possible, for maintenance to be carried out during week-ends or holiday periods.

In establishing the system, power presses, which were regarded as being of major importance, were dealt with first, and experience over a period of about 18 months has clearly shown the advantages to be gained. Under the conditions previously obtaining, during the period July to December, 1956, 2,520 man hours were spent on actual plant maintenance, and down-time on the presses was considerable. During the first 6-month cycle of the maintenance scheme, from January to June, 1957, 600 hours were spent on inspection, and 1,170 hours on scheduled maintenance and breakdowns, giving a total of 1,770 hours. In the second 6-month period the inspection time was reduced to 480 hours, and repair time to 990 hours, resulting in a total of only 1,470 hours work. Down-time has also been very much reduced, and it is stated that since the scheme was introduced not a single personal accident has occurred in the press shop.

On the standard report sheet issued for the examination of power presses, the fitter who undertakes the work is required to state the condition of the various components of the clutch mechanism, flywheel bearings, slide, brake, interlock guards if fitted, and any other important working parts. Particular attention is paid to the clutch mechanism, and it is the practice to stamp the date on the clutch keys of all new presses, and to date-stamp

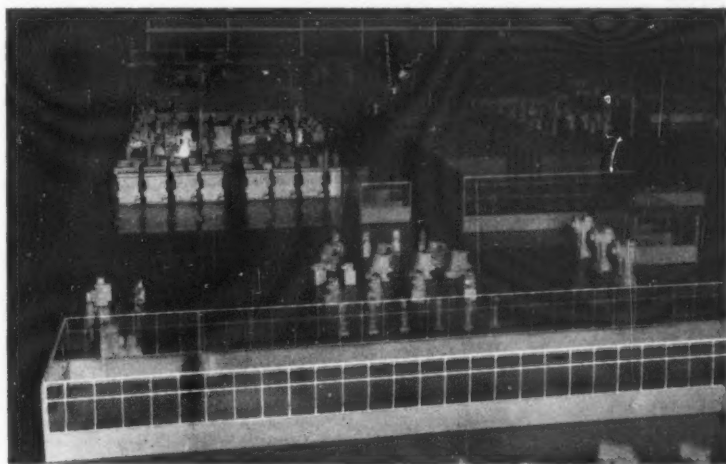


Fig. 19. View of part of the scale-model layout of the main machine shops which is employed as an aid to factory planning

them again at each inspection. After 12 months' service, the clutch key is renewed, irrespective of its condition. If the fitter considers that the press flywheel should be removed for a more detailed examination of the clutch mechanism, the report sheet is signed to this effect, and the work carried out. When a press is ready to be put into production again it is tested in the presence of the maintenance foreman, the shop foreman, and the company's safety officer, who then sign the report sheet if they agree that the press is satisfactory for production. The safety officer, it may be noted, is also provided with special labels which he can affix, at any time, to machines considered to be faulty from the point of view of safety. Repairs must

then be carried out before the presses can be released for production, and it is not permissible for any one except the safety officer to remove such a label.

Attention may here be drawn to the effective use which the company make of scale models of machine tools and equipment as an aid in preparing plant layouts. In a separate room in the plant office, the layout of all the machine shops is shown by these models, on a special table, which is marked to show the floor plan and measures 15 by 6 ft. A view of part of this layout is given in Fig. 19. Many of the models were supplied by Visual Planning Systems, Ltd., who specialize in this field.

Large Magnetic Crack Detector

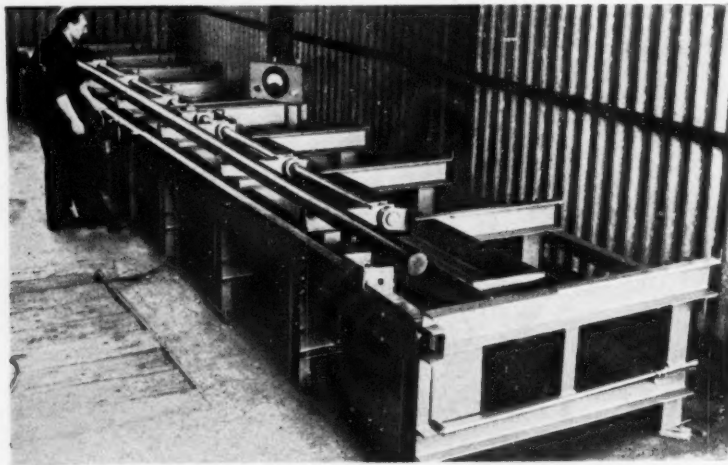
Designed for the surface inspection of bars up to 6 in. diameter by 30 ft. long, the magnetic crack detector here shown, to which brief reference has already been made in MACHINERY, has been built by Johnson & Allen, Ltd., Smithfields, Sheffield, 3.

Bars to be checked are first loaded on to a rack, of 5 tons capacity, on the rear of the frame, and are then rolled forward, one at a time, as required, so that they rest against stops at the front ends of six short arms, as seen in the illustration. Each arm incorporates a roller on which the bar is carried, and with this arrangement, unloading is easily effected axially after the checking operation has been performed. At the opposite ends, the

arms are secured to a common shaft which is divided at the centre by a crank operated by a double-acting air cylinder.

In operation, when air under pressure is admitted to the appropriate end of the cylinder, the shaft is turned through a small angle with the result that the free ends of the arms are swung downwards and the bar is lowered on to V-blocks in a bath of Neocol ink, which contains small iron particles. Next, an alternating current of high amperage is passed through the bar. Air is then admitted to the opposite end of the cylinder so that the bar is lifted on the arms out of the ink bath, and the positions of cracks can then be detected by the presence of iron particles.

Ink in the bath is agitated continuously by means of submerged air jets to prevent the iron particles from settling at the bottom. In addition, exhaust air from the cylinder is discharged into the bath to increase the degree of turbulence. The air control circuit provides for lowering and raising the load at a constant rate, regardless of variations in the weight. Current in the electrical circuit can be varied to suit bars of various sizes, and is indicated on an ammeter.



Large Johnson & Allen Magnetic Crack Detector

Typical Operations on Rocket Components

By CHARLES O. HERB and W. EDWARD MOLLER*

More than one million liquid- and solid-propellant rockets have been produced by the Aerojet-General Corporation during the past few years, and power plants and boosters of this type, also various components, are being supplied for use in many of the missiles constructed in the U.S.A.

These products must operate satisfactorily in space flight, at the extremely high and low temperatures encountered. In addition, engines and components for missiles must withstand high internal pressures, and the action of corrosive liquids and gases. Components and welded assemblies must be machined to close tolerances to meet the exacting requirements. It has also been necessary to develop methods of machining parts of unusual contour and complexity. For example, 4,000 holes of small diameter must be drilled in one part to accurate centre distances. In addition, many of the components are made from high-strength heat-resisting metals which are difficult to machine.

This article describes some typical operations performed in the machine shop of the liquid-rocket manufacturing plant which was provided by the U.S. Air Force at the Sacramento, Calif., works of the Corporation. This plant operates 24 hours a day, six days a week. Much of the work carried out cannot be described because of security regulations.

Machines installed include a Monarch Dyna-Shift engine lathe with a swing of 48 in. over the ways and 36 in. over the cross-slide, which will admit parts up to 63 in. long between centres. This lathe is employed for a wide variety of work, including turning and facing of the front and rear surfaces of injector heads to elaborate contours. One side of the injector head is concave in general outline and the other convex. The diameter of such a head may exceed 2 ft., and machining is normally carried out in roughing and finishing stages, with intermediate heat-treatment.

Injector heads are machined from 17-7 precipitation-hardened stainless-steel forgings. Many surfaces of the finished heads must be to specified dimensions within ± 0.0025 in. Apart from the finishing of the various surfaces, a series of 20 or more annular grooves must be cut in the concave

surface of certain injector heads. These grooves are parallel at the top and have rounded roots, and they range from 0.250 to 0.400 in. wide and from 0.250 to 0.400 in. deep. Limits of ± 0.005 in. must be maintained for both size and diameter. The lands between the grooves are usually about 0.04 in. wide.

Fig. 1 shows a set-up on the Dyna-Shift lathe for contour-turning an aluminium nozzle of about 15 in. maximum diameter. The path of the cutter is controlled by the stylus of an air-gauge tracer mounted on a bar which extends towards the rear from the tool-slide. Dimensions of this component are held to size within ± 0.003 in. The air-gauge tracer enables changes in set-up to be made in a few minutes.

Another feature of this lathe which facilitates the machining of parts made from various materials

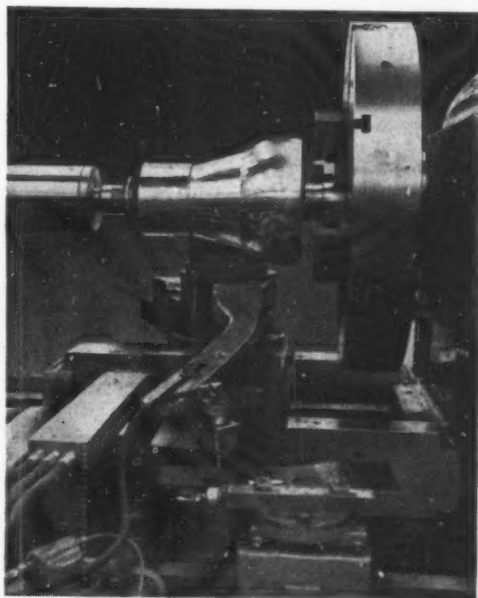


Fig. 1. Set-up for turning a rocket nozzle accurately to the required contour on an engine lathe with an air-gauge tracer

* Liquid Rocket Plant Manufacturing Division, Aerojet-General Corporation, U.S.A.

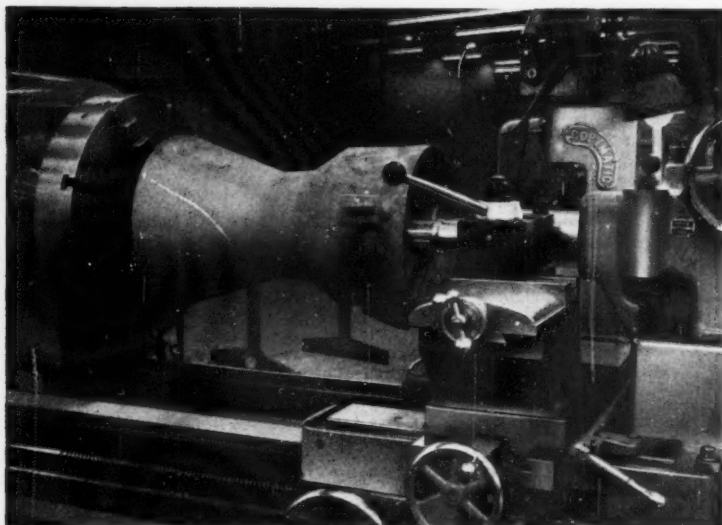


Fig. 2. Machining the large-diameter bore of a case assembly on another engine lathe, with the overhanging end supported by an expanding arbor on the tailstock spindle

is the Dyna-Shift drive to the headstock. Correct spindle speeds for any operation can be determined within seconds without the need for any calculations. The operator sets the indicator to the desired surface speed and then sets another indicator to the diameter of the work. Correct speed for the cut is then obtained automatically, and is shown on an indicator for reference purposes.

The bore of a case assembly is machined on a Lodge & Shipley lathe, as shown in Fig. 2, within limits of 16.625 and 16.635 in. This welded component, which is of 17-7 precipitation-hardened stainless-steel, has an overall length of approximately 30½ in. The boring cuts are taken for a length of 4 in. Support for the overhanging end of the work is provided by

an expanding arbor mounted on the tailstock spindle.

An ingenious step-drilling operation on an injector plate is performed on the special Leland-Gifford machine shown in Fig. 3. This part, also, is of 17-7 precipitation-hardened stainless steel, and is approximately 20 in.

square. Twenty-five holes of 0.250 in. diameter must be drilled from all four sides. One hole is drilled at a time, to a given depth in the part, by each of the two opposed drill spindles, the greatest depth being approximately 9 in. After the holes have been drilled from two sides, the plate is indexed through 90 deg. on its fixture to present the remaining sides of the plate to the spindles. Similar holes are then drilled from these sides, and the passages formed must intersect within 0.005 in.

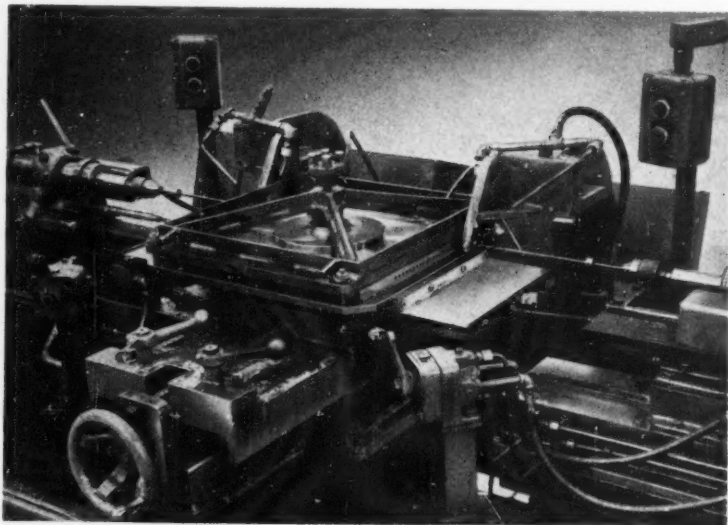


Fig. 3. Twenty-five holes of small diameter are drilled from all four sides in this injector plate. The opposed holes must be aligned within a tolerance of 0.005 in. at a depth of 9 in.

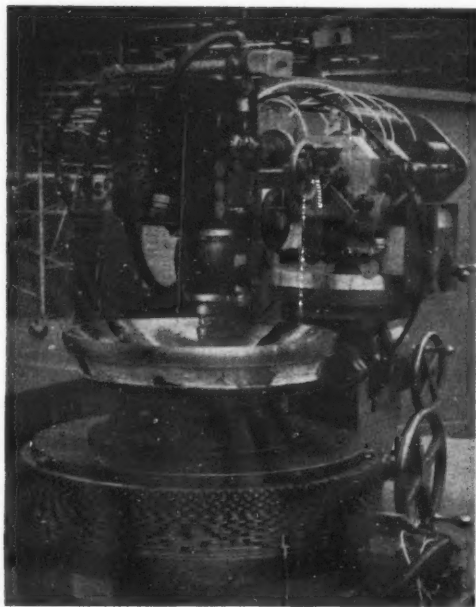


Fig. 4. Four thousand holes of small diameter are drilled to accurate centre distances in injector heads on this machine which incorporates a special indexing arrangement

Movement of the fixture from rear to front to position the work for drilling successive holes is effected by means of a handle at the front of the cross-slide. Movement of the handle actuates a plunger which engages with a series of locating grooves in a bar. The drilling heads are traversed hydraulically, and the operation is performed in steps.

Four thousand holes of 0.072 in. diameter are drilled in certain injector heads on the special machine in Fig. 4, which is equipped with a Dumore automatic drill unit.

Accurate indexing is ensured by engaging a dog (mounted on a slide seen at the right) with notches in the circular indexing plates provided on the table of the machine. Location of the circles is obtained by adjusting the drill-head unit in relation to the centre of the work. For this purpose, the head is mounted on a square arbor that slides in a guideway at the rear. The correct positions of the drill-head unit are obtained by engaging a plunger with detents in a horizontal bar that slides with the head. For drilling the 4,000 holes about 30 hours is required.

Sometimes the work assigned to the large Carlton radial drilling machine in Fig. 5 seems rather incongruous. It is shown set up for drilling small holes round the flange of a fuel fitting assembled to the injector end of a large thrust chamber. This part could not be drilled until the thrust chamber had been assembled, and because of the height of the unit, the operation had to be performed on a radial drilling machine with a high column.

It will be seen that the thrust chamber is mounted in a fixture constructed from tubing which permits convenient transfer about the shop. A pit has been provided at one side of the radial drilling machine to enable work to be handled which is higher than the distance from the floor or table to the spindle nose, when the arm is at its maximum height. At the same set-up, 24 holes are drilled around the central portion of the engine face. For this operation, the spindle is automatically fed to within $\frac{1}{2}$ in. of the required depth, and a special hand feed is then engaged, to enable the holes to be finished to the depth tolerance of 0.001 in.

Radial location of the holes on a pitch circle of 15.50 in. is also held within close limits. To obtain the required accuracy, a master drill jig is employed, which is co-ordinated to a hole pattern

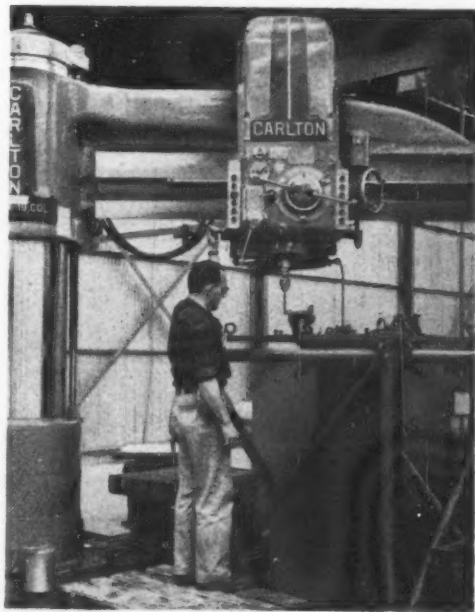


Fig. 5. The height of some assembled missile units necessitates the use of a large capacity radial machine for final drilling operations.

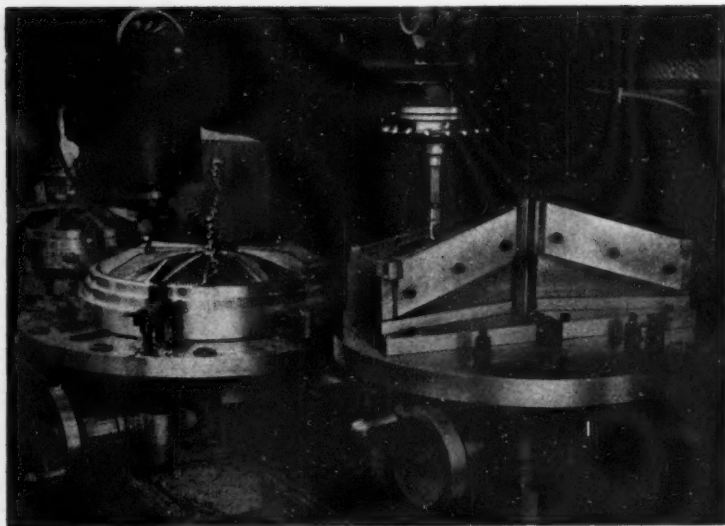


Fig. 6. Close-up view of the set-up on a large Hydro-Tel milling machine for producing 12 propellant cavities in the convex side of each of two injector plates, simultaneously. The arrangement of the two templates required is clearly shown

on the injector head. Hole centre distances must be correct within 0.0005 in.

A large Cincinnati Hydro-Tel milling machine, a close-up view of which is given in Fig. 6, is also employed for a considerable variety of work. For the operation shown, only two of the three milling spindles can be employed because of the size of the work. With this set-up, injector heads of 17-7 precipitation-hardened stainless-steel are machined on the outer surface to form the propellant-

required because there are cavities of two different forms around the injector head. When one series of cavities has been milled, the circular table on which the templates are mounted is indexed through 180 deg. to bring the second template into position. The cavity depth ranges up to 1½ in. and must be held to limits of ± 0.005 in. Subsequently, the cavity surfaces are finished to a high degree of smoothness by hand polishing.

Another Cincinnati Hydro-Tel machine is shown in Fig. 8, set up for an operation on a spider gimbal. The part is produced from a solid aluminium billet, which is first rough-cut to the approximate outline on a DoAll band-sawing machine. Pockets are then milled in the legs of the gimbal, and, finally, the complete profile is milled accurately to the required outline.

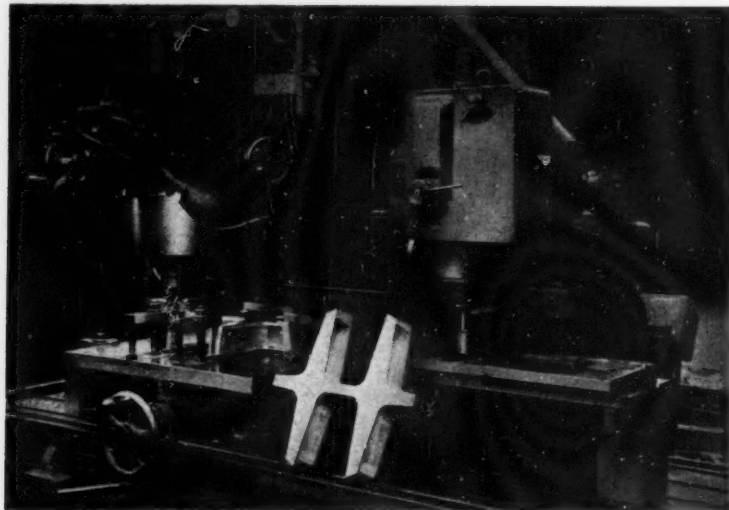


Fig. 7. Hydro-Tel machine set-up for the final contour milling operation on a spider gimbal which is machined from a solid block of aluminium

Multifactor Type 22 Automatic Rotary Transfer Machine

The type 22 automatic rotary transfer machine shown in Fig. 1 is the latest addition to the Multifactor range built by Haesler-Giauque & Cie, Boudry, Switzerland.

Indexing work tables with different numbers of air-operated fixtures up to 12 can be provided, and vertical- and horizontal-spindle tool heads with hydraulic feed cylinders may be mounted on the substantial cast-iron base at the various machining stations. Provision can be made for the work fixtures to be turned on their own axes while the table is being indexed, and then located, positively, by plungers, so that different faces of the workpiece

Fig. 1. Multifactor type 22 automatic rotary transfer machine

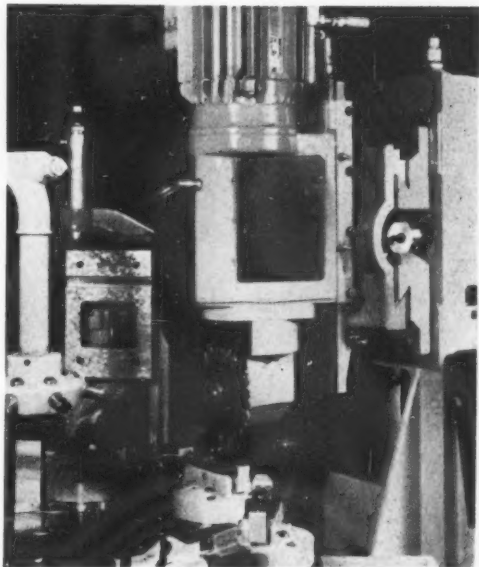
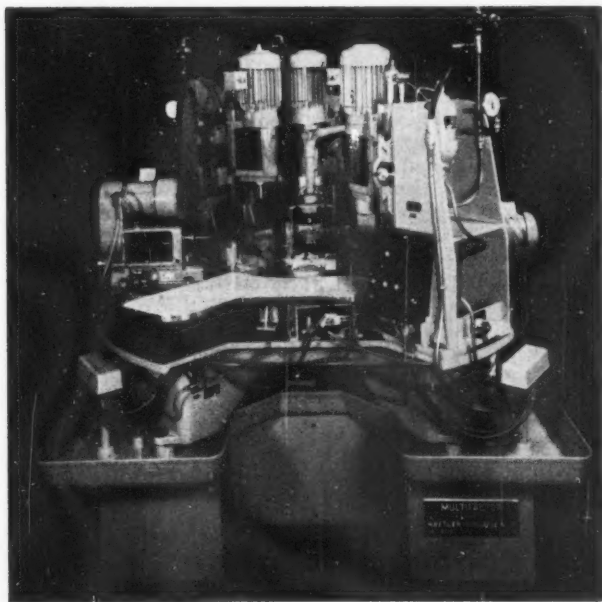


Fig. 2. The vertical-spindle heads are mounted on compound slides with power feeds, and may be fitted with right-angle drive attachments for side and face milling cutters, as here shown

can be presented to the cutter heads.

The vertical-spindle heads may be fitted with swivelling, right-angle drive, attachments for the mounting of side and face milling cutters as shown in the close-up view Fig. 2. Alternatively, they may be equipped with twist drills and end mills. Each head is mounted on a compound slide, and vertical and horizontal power feeds can be applied successively, for example, when slots are to be milled in the workpiece. Vertical feed strokes of 3, 5 and 8 in., and various horizontal traverses can be provided. Rapid return of the spindle head, vertically and horizontally, to its starting position, at the end of the cutting cycle, is effected by an air-hydraulic accumulator.

Different feed strokes can also be provided for the horizontal spindle heads, one of which is shown in Fig. 3. The spindle, gear box and drive assembly is traversed hydraulically on guideways on a base during

the cutting stroke, and, upon completion, is returned to its starting position by a pair of powerful tension springs. To enable the spindle head to be adjusted for height, the base guideway member is mounted on a pair of wedges.

Drive for the vertical- and horizontal-spindle heads is taken from 2½-h.p. motors, and oil mist lubrication is provided for the spindle bearings and gear boxes. The working stroke of the hydraulic feed cylinder is controlled, positively, by a stop, and the spindle head can be adjusted on its guideway by a micrometer screw for varying the depth of cut. The spindles are bored at their nose ends to take holders for pre-set cutting tools.

Feed motions are derived from a camshaft which is mounted at the rear of the bed and driven by a 2-speed pole-changing motor through a flat belt and pulleys and worm gearing. Different cycle times are obtained by means of interchangeable belts and pulleys. Plate-type cams mounted on this shaft operate, through the medium of spring-loaded followers, the pistons of hydraulic cylinders, which are connected by pipes to the feed-cylinders incorporated in the cutter heads. Discharge of fluid from one cylinder, by the action of a cam, thus results in operation of the corresponding feed cylinder, so that the associated spindle head is advanced to perform the cutting stroke.

For indexing the work table, motion is trans-

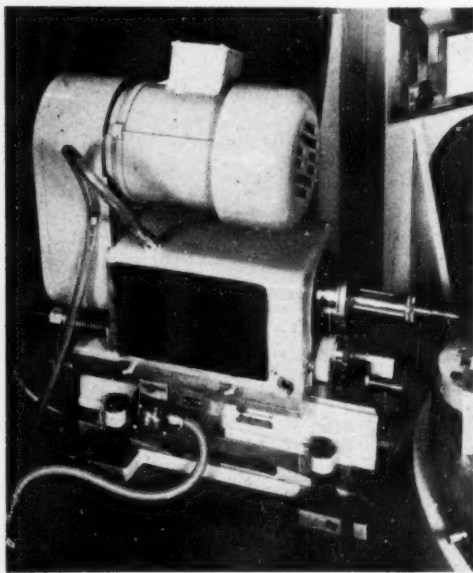


Fig. 3. One of the horizontal-spindle cutter heads on the Multifactor machine

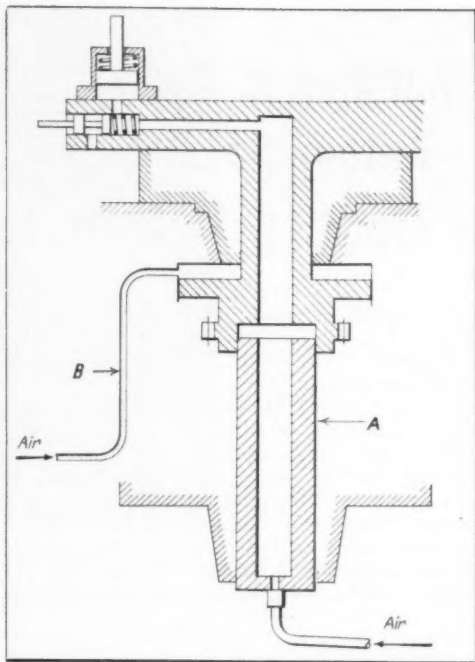


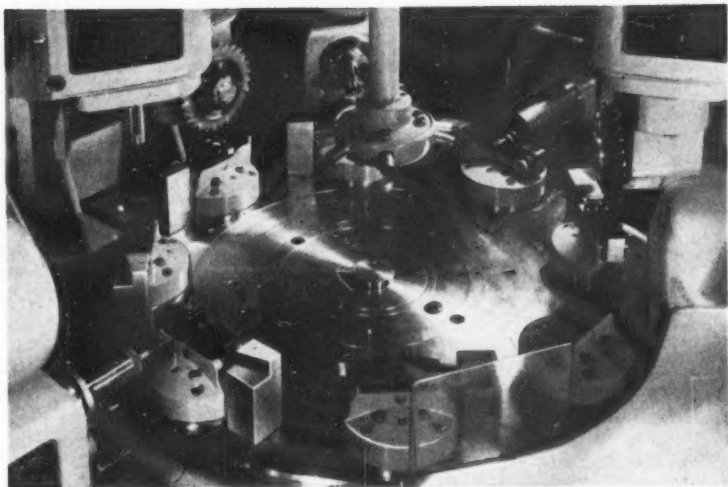
Fig. 4. Diagrammatic sectional view of the table, showing part of the compressed air system for operating the work fixtures, also clamping and relieving the table

mitted by gearing from a Geneva mechanism which is connected to the worm in the camshaft drive by a universally-jointed shaft. When all the spindle heads have been brought clear of the work, upon completion of the cutting cycle, the higher motor speed is automatically engaged so that rapid indexing of the work table is obtained.

Referring to the diagram, Fig. 4, compressed air for operating the work-holding fixtures passes through the fixed sleeve A and a central bore in the table stem, to radially-extending holes. Plungers, projecting from the periphery of the table, are operated, in turn, by a small air cylinder at the unloading station, to release the component in readiness for removal from the clamping jaws either by hand or by an air-operated ejector. A plunger can also be depressed, by hand, for releasing a workpiece at any machining station, if required.

Upon completion of the indexing movement, compressed air is delivered through the pipe B, to the top surface of a large-diameter flange at the

Fig. 5. Close-up view of the 8-station work table and cutter heads for machining the part shown at A in Fig. 6



lower end of the stem, so that the table guiding surfaces are held in close contact with the bedways, in opposition to the force exerted by the air pressure in the central bore. At the same time, the table is accurately located for angle by a wedge-shaped plunger which is brought into engagement with a slot in the indexing ring by an air cylinder. In readiness for the next indexing movement, the plunger is withdrawn from the ring, and the compressed air supply to the flange on the table stem is interrupted. As a result, the table is partly supported by the air pressure in the central bore, and indexing is thus facilitated.

At one end of the camshaft, there is a number of adjustable trip dogs for operating micro-switches which form part of a comprehensive system of electrical interlocks. Faulty operation of the

machine, resulting, for instance, from a cutter having become blunt or broken, causes the pressure in the hydraulic system to rise, and the main driving motor is then automatically stopped. Rapid stopping of the camshaft, and, consequently, of the feed motions, is insured by an electro-magnetic brake on the driving motor.

The operating cycle is controlled by push-buttons mounted on a panel at the loading station. When a fresh blank has been mounted in the fixture at this station, depression of the push-button marked "clamp," while machining is in progress on other components, causes the machine to resume its automatic cycle of operations. Clamping of the work at the loading station, indexing of the table, and operation of each spindle head, are indicated by coloured signal lamps on a separate floor-mounted cabinet which houses the electrical equipment.

The machine can be supplied fitted with work-holding fixtures and spindle heads for handling a variety of small- and medium-size components, and a set-up for performing numerous operations on zinc pressure die-cast bodies and covers for windscreen wipers was described in *MACHINERY*, 91/807—4/10/57. Fig. 5 is a close-up view of a 32-in. diameter 8-station work table and the tool heads employed for machining the cast iron component seen at A in Fig. 6. When required, however, the machine can be quickly set for performing operations on the mild steel part shown at B.

Referring again to Fig. 5, a blank for the part A is loaded horizontally into the fixture at the extreme right-hand side, and when the table has been indexed (in an anti-clockwise direction) the central

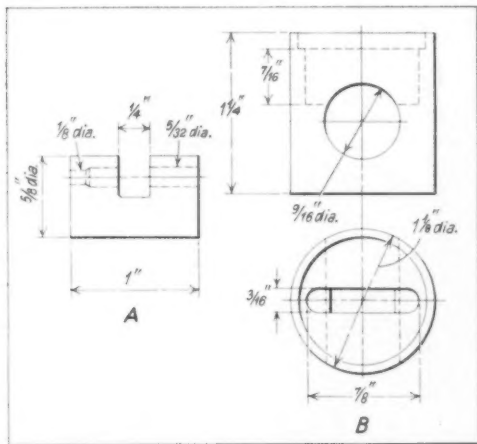


Fig. 6. The cycle time for machining the part A on the Multifactor machine is 10 sec., and for the part B, 15 sec.

slot is rough milled by a side and face cutter. For this operation, the vertical spindle head is fed downwards and then horizontally. At station 3, the $\frac{3}{8}$ -in. diameter portion of the off-centre stepped hole is drilled lengthwise in the component with a horizontal spindle head. This head differs from that previously described in that the body carries a bracket to take a guide bush for the twist drill, and feed is applied to the quill which surrounds the spindle by a hydraulic cylinder, through a rack and pinion. A machined face is provided at the front of the body, on which a spindle unit with power feed may be mounted vertically.

The $\frac{1}{2}$ -in. diameter end of the stepped hole is drilled at station 4 by a horizontal spindle head of the type shown in Fig. 3. Finish milling of the slot is carried out at station 5 with another side and face milling cutter, and station 6 is idle. A stepped reamer is employed at the 7th station for finishing the off-centre hole, and the completed component is removed from the fixture by hand at station 8. The cycle time for performing these operations is 10 sec.

When setting the machine for handling the

component B, Fig. 6, the pre-set jaw pieces on the fixtures are changed for others of different design which provide for holding the work vertically. The right-angle drive attachments are removed from the cutter heads at stations 2 and 5, and end mills are fitted to the spindles of these heads, also to the head at station 6.

This component is machined in a cycle time of 15 sec., and the sequence of operations is as follows.

At station 1, the part is loaded, and at station 2 the $\frac{1}{8}$ -in. wide slot at the upper end is rough milled for part of its depth. Drilling of the $\frac{3}{8}$ -in. diameter cross hole is carried out in two stages at stations 3 and 4, and at station 5, the slot is rough milled to full depth. A finishing cut is taken on the slot at the 6th station, and the cross hole is reamed at station 7. The completed workpiece is removed from the fixture at station 8.

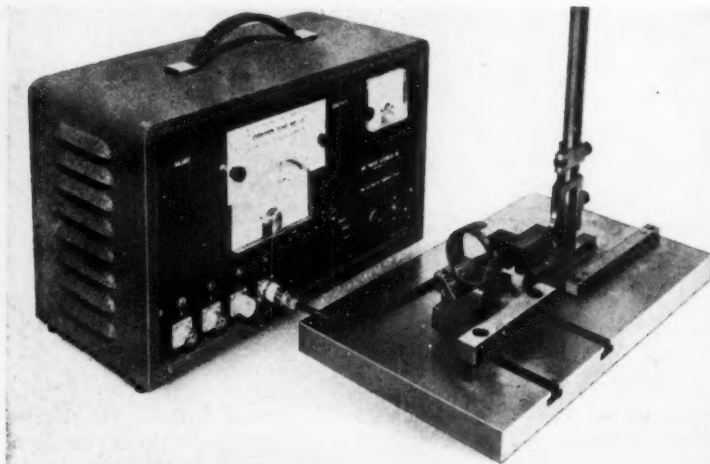
Haesler Sales Division of Adam Engineering Co., Ltd., 4 Grange Street, St. Albans, Herts, are the distributors in this country for Multifactor rotary transfer machines.

Measuring Coating Thickness in Bores

In the accompanying illustration is shown equipment which is employed by the Hamilton Standard Division of United Aircraft Corporation, Conn., U.S.A., for the non-destructive measurement of coating thickness. One application is concerned with the checking of hard-anodic coatings on alu-

minium alloy, but other metallic and non-metallic coatings, produced, for example, by plating or painting, can also be measured.

A Standard Dermitron type D-2 instrument is used in conjunction with a right angle probe. The latter is mounted in a special holder, of Hamilton design, which, in turn is fitted to a conventional height gauge. With this equipment, measurements may be made on the surfaces of holes down to $\frac{1}{2}$ in. diameter. The Dermitron unit operates on the eddy current principle, and can be supplied with four right-angle probes to cover a range of coating thicknesses.



**Dermitron Equipment
for Measuring Coating
Thicknesses in Bores**

Italian Machine Tool Exhibition, Milan—1

The first Italian Machine Tool Exhibition, organized by Unione Costruttori Italiani Macchine Utensili (U.C.I.M.U.) and held in Milan from September 12 to 21, was supported by some 530 firms, who occupied stands covering an area of about 270,000 sq. ft., and although the majority of the machines shown were of Italian make, an appreciable number of British, American, Belgian, French, German and Swiss machine tools were to be seen on the stands of the Italian agents. Some examples of machines from East Germany, Czechoslovakia and Hungary were also shown. An important section of the exhibition was devoted to cutting tools, gauging and measuring equipment, welding machines, die casting machines, and electrical equipment, and a certain amount of foundry equipment was also on view.

According to a report recently compiled by U.C.I.M.U., the production of machine tools in Italy rose from 23,550 tons in 1956 to 26,000 tons in 1957, and more than 50 per cent of the output was exported, principally to countries in Western Europe. Production for the first half of this year totalled 15,500 tons, and there has been an upward trend in exports. Imports of foreign machine tools for the Italian metal-working industries, on the other hand, have shown a sharp decline, and in the first part of this year they were about 50 per cent lower than in the corresponding period in 1957. The range of machine tools built in Italy has been rapidly extended during the past few years, and the requirements of the metal-working industries there are being met to an increasing extent by Italian machine tool makers. From the machine tools exhibited, it is evident that Italian firms in this field have a full appreciation of present day production requirements and of up-to-date trends in the

design of both standard and special-purpose equipment. Details of some of the Italian-built machine tools that were demonstrated are given here.

ZOCCA GRINDING MACHINES

Officine Meccaniche G. Zocca (Machine Tool Sales, Ltd.), who now employ about 300 people in their works at Como, exhibited some 14 machines from the extensive range of cylindrical and surface grinders which they make. Of particular interest is the type of R.P.S. hydraulic piston grinder, of patented design, shown in Fig. 1, which operates on a fully-automatic cycle and permits various combinations of ovality, and taper or barrel forms to be obtained. It will accommodate 10-in. between centres, and the maximum grinding diameter is 7 in. Workhead speeds up to 500 r.p.m. are provided, and the steplessly-variable traverse speeds for the hydraulically-operated table range from 2 in. to 26 ft. per min.

A close-up view of the workhead, with the cover removed to show the mechanism for producing ovality, is given in Fig. 2. Drive to the work-head A is taken, by V-belt, from a motorized speed

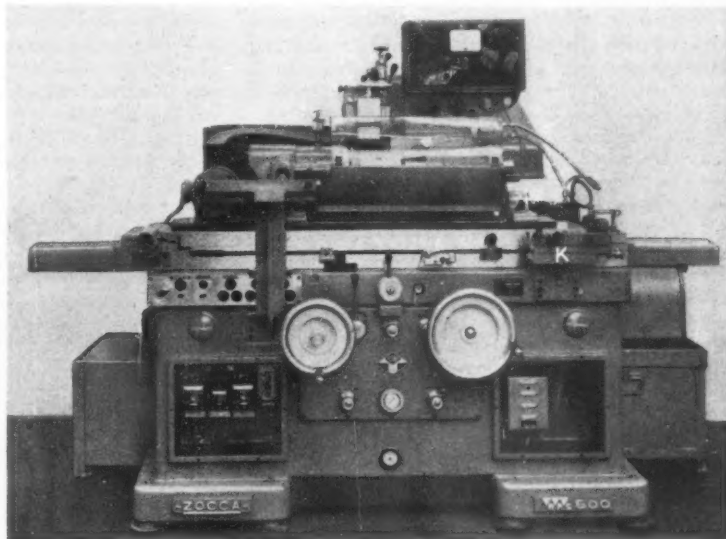


Fig. 1. Zocca type R.P.S. hydraulic grinder of patented design, for pistons up to 7 in. diameter

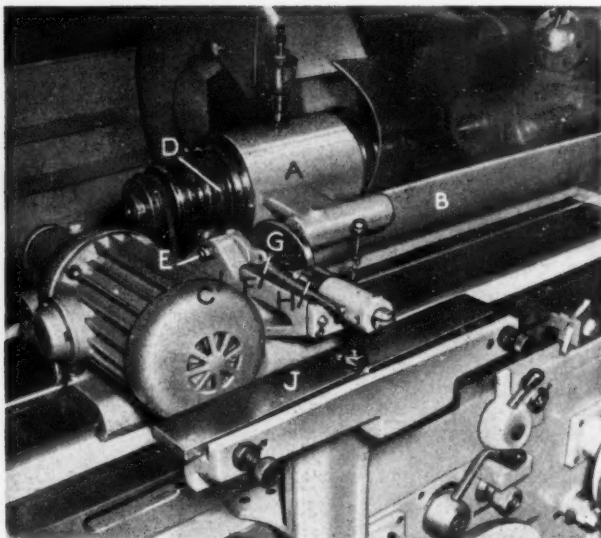


Fig. 2. Close-up view of the workhead on the Zocca piston grinder, with cover removed to show the mechanism for producing the required ovality

reduction unit mounted on the top table, the latter being swivelled during the traverse stroke of the main table to produce the required taper or barrel form on the piston. The work-head is integral with a cradle *B*, which is trunnion mounted at each end in brackets clamped to the top table, and is provided with a T-slotted machine face to take the tailstock. The trunnion bracket at the workhead end is seen at *C*.

Oscillation of the cradle, to produce the desired oval cross-section of the piston, is effected by an interchangeable cam *D*, on the workhead spindle, which is engaged, from beneath, by a roller carried on a horizontal lever pivoted at *E* in the trunnion bracket. A roller *F*, on the opposite end of this lever, bears against the under-side of a hardened-steel rock-

ing plate *G*, which is pivoted on a horizontal axis in the cradle. Also in contact with the lower face of the plate *G*, is a roller carried on the end of a horizontally-moving bar *H*, and another roller, at the opposite end of this bar, is held, by means of two tension springs, against a template bar *J*, mounted on a bracket bolted to the machine bed. The template bar can be adjusted angularly, and serves to alter, progressively, the fulcrum point of the cradle pivoting motion during the grinding traverse of the table, the required variation in the amount of ovality along the length of the piston being thus obtained. The swivelling movement of the upper table to produce a taper or barrel form on the work is controlled by means of an adjustable template bar at *K*, Fig. 1, on the main table, which is engaged by a roller on the upper table, under the pressure of a spring at *L*.

The machine operates on a fully-automatic cycle, which is started by moving a lever, and after the rapid approach of the wheel-head, in-feed up to 0.012 in. can be applied before the table traverse motion is engaged. There is a pedal control for the hydraulic tailstock, and a safety interlock ensures that it cannot be operated once the automatic cycle has started. Grinding wheels up to 16 in. diameter by 3 in. wide can be employed, and the wheel-head is driven by a 6-h.p.

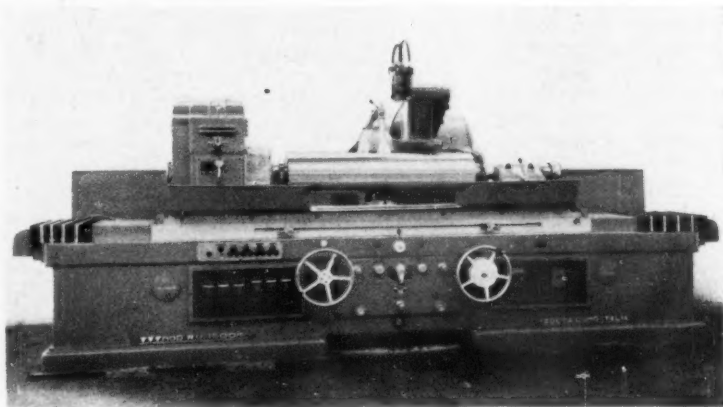


Fig. 3. Zocca type RU1500/6 hydraulic cylindrical grinder of 12-in. centre height, which accommodates 59 in. between centres

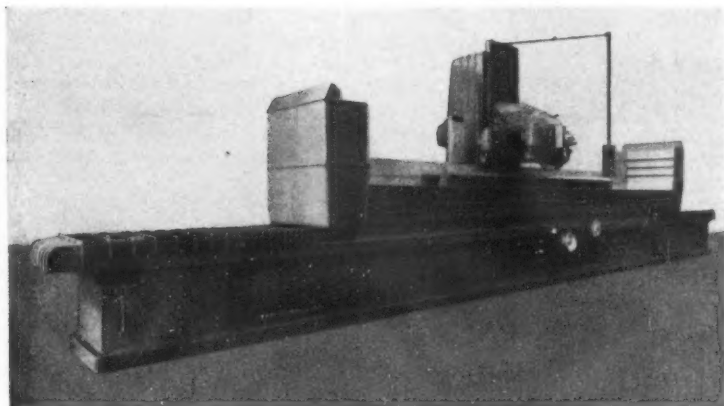


Fig. 4. Zocca type RPA 6000 hydraulic slideway grinder

motor. As an example of production times, it is stated that a piston of 4 in. diameter can be ground in 25 sec.

Cylindrical grinding machines made by the company range from the small RA250 universal machine of 4- by 10-in. capacity, up to the large RU-6 series, of 12-in. centre height, which are hydraulically operated, and can be supplied for grinding lengths up to 16 ft. 6 in. As representative of this series, the type RU1500/6 is shown in Fig. 3. It will accommodate 59 in. between centres, and the 26-in. diameter grinding wheel is driven by a motor of 16 h.p. Steplessly-variable wheel speeds, by magnetic amplifier control of the driving motor, can be provided if required, and the machine can be fitted with a high-frequency internal grinding head, or a superfinishing head, as shown, carried on a pivoted mounting on the wheelhead. Provision for hydraulic raising and lowering of these attachments can be made, if desired.

The wheel-head spindles of Zocca grinding machines are made from a nitriding steel, obtained from Sweden, which contains chromium, molybdenum and aluminium, and can be hardened to 70/80 Rockwell C. In addition to this high degree of hardness, the steel has the advantage of a low coefficient of expansion. At the front end, the spindle runs in a plain bearing provided with three tapered, equally-spaced axial ribs on the periphery, which locate in the tapered bore of the wheel-head casting. Axial adjustment of the bush produces the required running clearance by elastic deformation of the metal, which results in three bearing lands being formed for the spindle. Oil is supplied to a point between two of these bear-

ing lands and is drawn between the surfaces in contact by rotation of the spindle, to provide hydro-dynamic lubrication. At the rear end, the spindle is mounted in high-precision anti-friction bearings.

In addition, the company makes a wide range of peripheral-wheel and vertical-spindle cup-wheel hydraulic surface grinders, including large-capacity machines for slideway grinding. The latter, known as type RPA, are available with grinding lengths up to 20 ft., and

the largest machine, type RPA 6000, is shown in Fig. 4. It is fitted with a peripheral wheel-head and two vertical-spindle heads, and the maximum grinding cross travel is 24 in. Steplessly-variable traverse speeds up to 100 ft. per min. are available for the table, and the wheel-heads can be traversed continuously at rates up to 50 ft. per min. in the transverse direction. Intermittent cross-feed in increments from 0.08 to 0.8 in. per table stroke, can also be applied. The down feed at each transverse or longitudinal stroke ranges from 0.0002 to 0.0025 in., and the feed can be stopped with a high degree of precision when the required size is reached. Rapid vertical power traverse is provided by a separate drive. The hydraulically-operated dressing device permits wheels to be formed to an angle for grinding V-slideways, and measuring devices can be incorporated in the machine for checking the straightness and profile of the ground ways on the workpiece. It may be noted that a Zocca slideway grinder of 12-ft. stroke, with a 48-in. wide table and a height capacity of 40 in., is being built for Birfield Tools, Ltd., Coventry, who make the Somua type Z milling machines described in MACHINERY, 93/956—22/10/58.

Fig. 5 shows another hydraulic surface grinder from the Zocca range, which incorporates a swivelling column fitted at one side with a vertical cup-wheel head, and at the other with a peripheral wheel-head, which can readily be brought to the working position. Designated type RPAT, machines in this range can also be supplied with a fixed column mounting a peripheral wheel-head only, and they are available with grinding length capacities of 20, 26, 33 and 43 in. Steplessly-variable

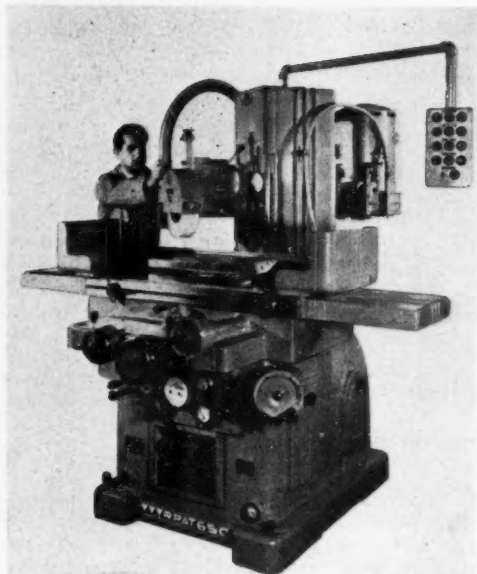


Fig. 5. Zocca type RPAT hydraulic surface grinder with peripheral wheel and vertical cup wheel spindle heads on an indexing column

table speeds up to 100 ft. per min. are provided longitudinally, and up to 50 ft. per min. transversely. Increments of transverse feed from 0.08 to 0.8 in. can be applied at each stroke of the table. Power down-feed to the wheel-head ranges from 0.0002 to 0.0025 in. per stroke, and a precision depth stop is incorporated which automatically trips the feed motion.

MAXNOVA PRODUCTION LATHES

Maxnova - Meccanica di Precisione, Novara (Catmur Machine Tool Corporation, Ltd.), have been active in the development of their Profilomatic hydraulic copying lathes, and a number of new machines

has been introduced. Fig. 6 shows the Profilomatic 320-22—one of a new, standardized MEC series which has been designed to meet the requirements of the small works, as well as the larger plants engaged in quantity production. It incorporates a front hydraulic copying slide and will swing 17½ in. over the bed, and 7 in. over the carriage. Features of the design include a single-piece headstock and bed casting, with integral gearbox, and hardened and ground slide-ways. The headstock spindle has three-point support and runs in pre-loaded high-precision anti-friction bearings. Driving motors up to 13 h.p. can be fitted, and either 6 or 12 spindle speeds, up to a maximum of 1,200 or 1,600 r.p.m. can be provided in the standard ranges, or up to 2,200 r.p.m., in a high range.

The duplicating system, supplied by an independent hydraulic pump unit, enables both transverse and longitudinal copying to be performed, and a multiple, indexing, template holder of patented design is fitted. When 12 spindle speeds are provided, two speeds can be employed during the machining operation without interrupting the cycle, and a lever-operated change of feed rate can also be made. An automatic stop is fitted for the carriage travel, and multiple depth stops for the duplicating slide can be incorporated if desired. Six rates of carriage feed from 0.0047 to 0.020 in. per rev. are normally available, but, if required, 12 rates from 0.002 to 0.020 in. per rev. can be provided. A feature of all Maxnova lathes, it may

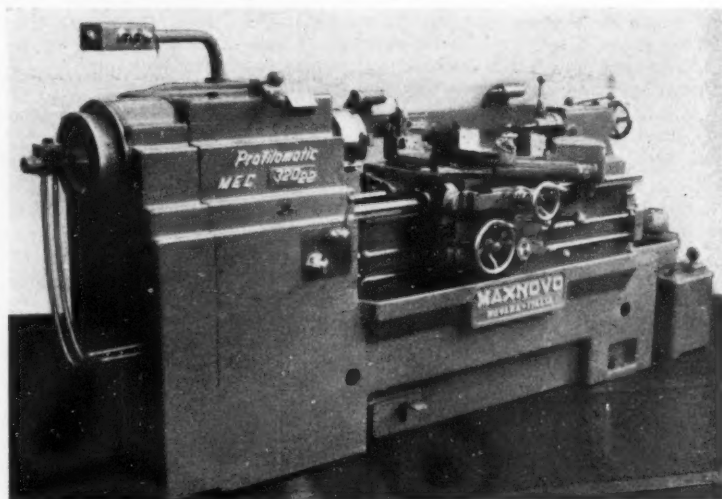


Fig. 6. Maxnova Profilomatic 320-22 hydraulic copying lathe

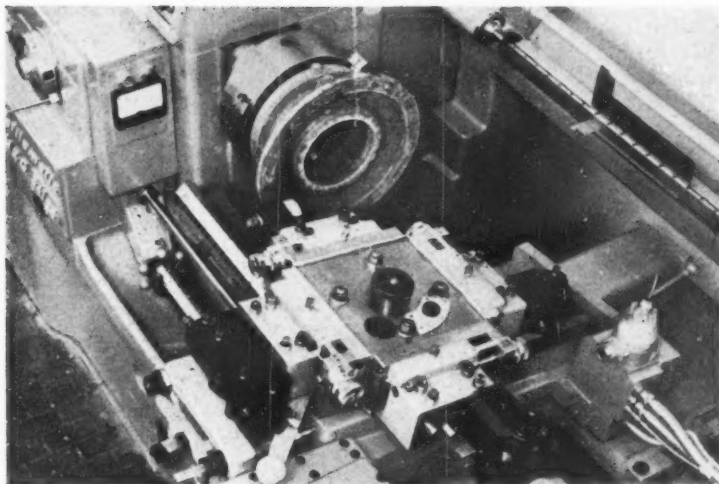


Fig. 7. Close-up view of the Maxnovo Profilomatic 341-25 hydraulic copying lathe, showing the 4-station indexing tool turret

be noted, is the use of the "Polygon K" profile for both sliding and fixed gears and couplings.

Another copying lathe from the standardized MEC range, designated type 311-25, incorporates many of the features of the type 320-22, but is of larger capacity and has a wider scope for quantity production applications. The swing capacity over the bed is 21 in., and over the carriage, 8 in., and a driving motor of 12/15 h.p. is normally fitted. For heavy-duty applications, a motor of 20/22 h.p. can be provided. Sixteen spindle speeds, from 50 to 1,000 r.p.m., or 100 to 2,000 r.p.m., are normally available, but, if required, a 32-speed headstock with a range of 50 to 2,000 r.p.m. can be supplied. Either two or four different spindle speeds can be engaged during the automatic cycle, according to the speed range of the headstock.

The carriage and duplicating slide can be traversed rapidly in both directions, and the carriage is returned automatically to the starting position upon completion of the cutting cycle. Multiple stops for both the carriage and duplicating slide can be fitted if desired. Another feature is the provision of a hydraulic servo control to facilitate traversing the carriage smoothly along the bed by hand. If required, the multiple template holder mounted at the rear of the bed can be arranged for power indexing, under push-button control, and hydraulic operation can be provided for the tailstock. To facilitate the disposal of swarf and coolant, the copying slide is mounted at an angle on the front of the carriage.

Another version of this hydraulic copying lathe, known as the type 341-25, incorporates a 10-in. square, 4-station indexing tool turret on a copying slide of robust design, as seen in the close-up view, Fig. 7. The tool turret is indexed and locked by hand, and power operation, under push-button control, is provided for the indexing template holder. With this arrangement, a workpiece requiring a series of operations, including longitudinal and transverse copying, can be machined complete at one setting.

A new design of hydraulic multi-tool

lathe for chuck work, known as the Automax 22, is shown in Fig. 8, fitted with Facomax air-operated loading and unloading equipment. Designed for medium and large batch production, it has a chuck capacity of 9 in., and incorporates a wide carriage whereon can be mounted one or more Maxnovo Unit-Max hydraulically operated tool slide units, arranged according to the requirements of the work. These units have independent feed and rapid traverse motions and can be brought into operation in any desired sequence. The machine cycle is started by depressing a push-button, and upon completion of the operation the carriage returns rapidly to the starting position. Driving motors from 10 to 18 h.p. can be fitted, and spindle speeds up to 2,200 r.p.m. are available, and can be changed during the automatic cycle.

The Facomax air-operated work handling equipment, used in conjunction with an air-operated chuck, is provided with two swinging pick-up arms which are linked together and so arranged that the rear arm picks up a fresh workpiece from the incoming magazine, while, simultaneously, the front arm engages the piece in the chuck. The pick-up heads then move axially and the arms swing over to deposit the finished piece in the outgoing chute, and load the fresh piece into the chuck.

The company has also introduced the rotating-master Profilomatic 350-22 hydraulic copying lathe, of 8½-in. centre height, shown in Fig. 9. This machine, in addition to operations on dies, moulds, cam contours, and other internal or external pro-

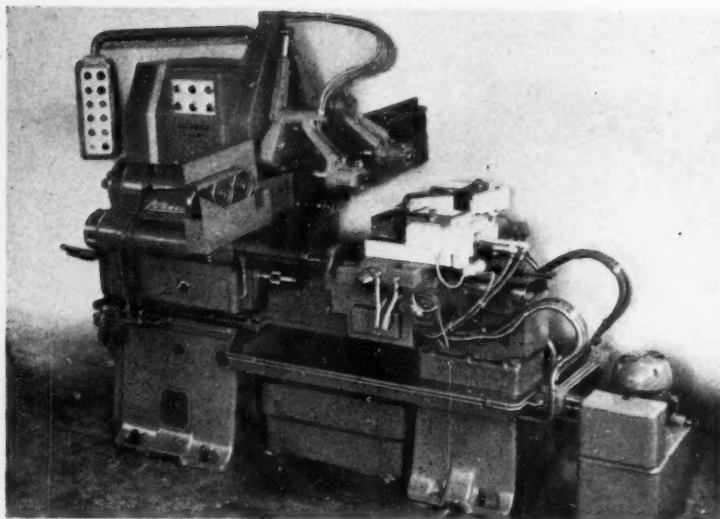


Fig. 8. Maxново Automax-22 hydraulic multitool lathe equipped with a Facomax work handling unit

files, can be used for turning shafts and similar workpieces by positioning the copying slide at an angle, and disengaging the rotating drive for the master. It can also be employed for conventional turning operations, and a rear tool-holder can be fitted. Driving motors up to 7 h.p. can be provided, and 15 spindle speeds from 5 to 760 r.p.m. enable a wide range of work to be handled. The spindle is bored 2 in. diameter, and the eight rates of carriage feed normally range from 0.003 to 0.024 in. per rev. The maximum diameter of rotating master that can be accommodated is 12 in.

Reference may also be made to a Profilomatic-AB hydraulic copying lathe, with multiple tool-slides, for the large-scale production of such parts as gear blanks and bearing races. The automatic cycle of this machine is controlled by

the firm's Telephoto-mation punched-card system, some details of which have already been given in MACHINERY, 91/1264 — 29/11/57. The punched-card, in the form of a disc, is placed over an indexing dial with 12 radial rows of holes, each row comprising six holes. Holes in the card correspond to the operation sequence required on the machine, and they allow light from a lamp house at the front to shine through the disc on to a photo-cell at the rear. The electrical impulse thus generated is amplified and operates a relay to change the functioning of the machine. Indexing of the disc can be controlled

either by a timing dial in the cabinet, or by means of micro-switches actuated by movements of the machine slides.

Recent development in connection with the high-speed threading lathes built by the Italian firm Mannaioni (Elgar Machine Tool Co., Ltd.) include

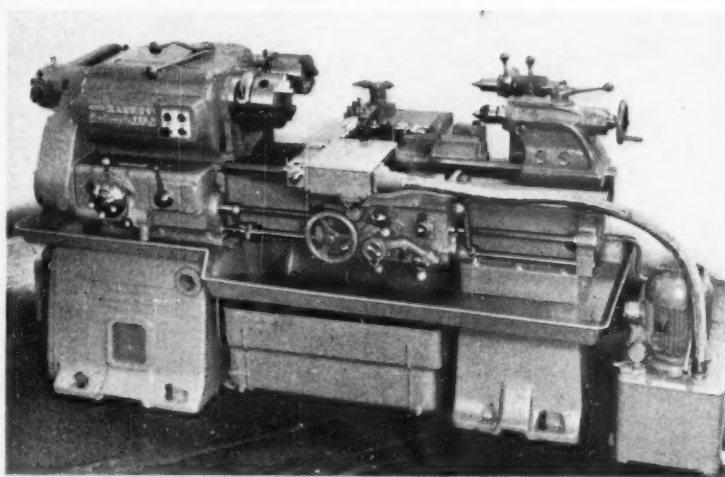


Fig. 9. Maxново Profilomatic 350-22 rotating-master hydraulic copying lathe for operations on dies and moulds

the provision of hydraulically-operated attachments for copy turning, facing and cutting off, and taper threading, which considerably increase the scope of the machines.

The firm's Hydro Man-au-cycle 3-in. lathe, which accommodates 36 in. between centres, and will cut threads up to 28 in. long, is shown in Fig. 10 equipped for hydraulic copy turning, and fitted with the taper threading attachment. Arranged overhead, the copying saddle is fitted with an angular tool slide and is traversed by electric motor and screw along an auxiliary bed which is bolted to inclined facings provided for this purpose at the rear of the main bed. These facings also serve for mounting the cutting-off and facing attachment, as seen in Fig. 11. With this arrangement, stepped shafts, for example, which require to be threaded, can be produced at the one set up from bar stock or forgings, with the threads concentric with the plain diameters.

Seen fitted in Fig. 10, the taper threading attachment replaces the normal front cover of the apron, and can be mounted in only a few minutes. Control of the threading tool slide, to produce the required taper, is effected by a copying system superimposed on the existing hydraulic control arrangement for the slide, and a roller-type stylus

is employed which makes contact with an adjustable sine bar fastened at the required position on a mounting plate bolted to the front of the base casting.

The hydraulically-operated facing and cut-off slide (Fig. 11) permits threaded pieces to be conveniently produced from bar stock, and it can also be employed for carrying out chamfering and undercutting operations, for example. Provision is made, when facing, for retracting the tool axially by a small amount, to avoid drag during the return stroke. The cycle of rapid approach, in-feed, and quick return is initiated by moving a hand lever.

ATTACHMENTS FOR RIGIVA MILLING MACHINES

A noteworthy feature of the Rigiva knee-type milling machines made by Officine Riva (Thos. W. Ward, Ltd.) is the extensive range of attachments that is now

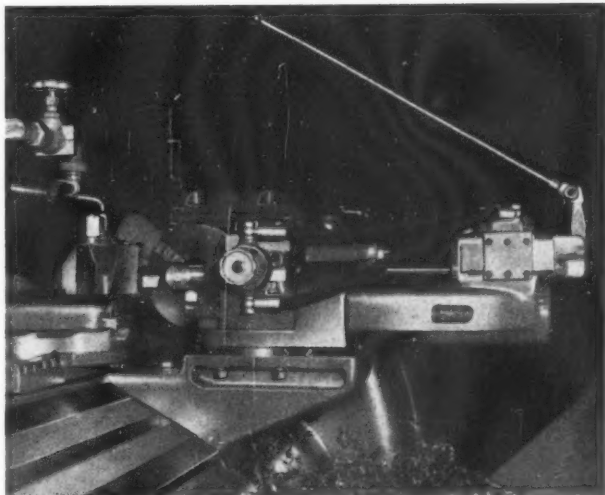


Fig. 11. Close-up view from the rear of the Mannaioni high-speed threading lathe fitted with a facing and parting-off slide

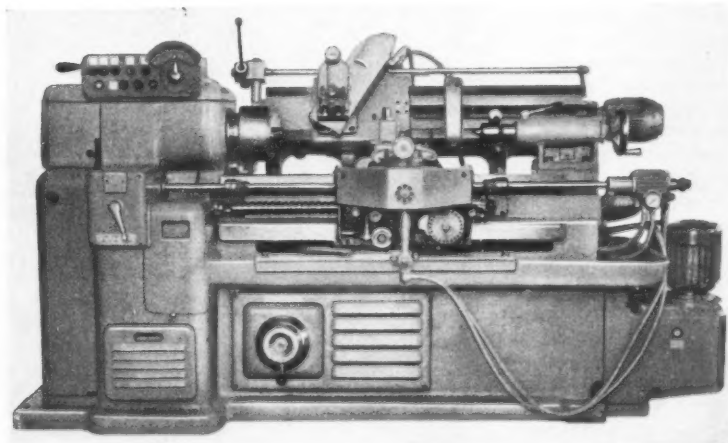


Fig. 10. Mannaioni Man-au-cycle high-speed threading lathe equipped for taper threading and copy turning

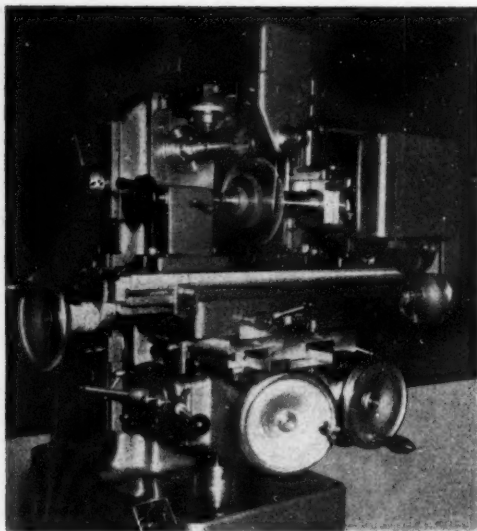


Fig. 12. Rigiva horizontal mill with a hobbing attachment for spur and helical gears

available, whereby the field of application is considerably increased. Fig. 12, for example, shows the latest design of hobbing attachment, which enables spur and helical gears to be hobbled, also spline shafts and chain wheels. It has a capacity for hobbing gears up to about eight module, and the number of teeth cut is determined by change gears on the dividing work-head. Drive to the work-head is transmitted from a bevel gear carried on the spindle arbor, which meshes with a gear housed in a bracket, the latter being mounted on the lower dovetail ways of the overarm. From this bracket, the drive is taken by way of gears and a horizontal and a vertical shaft, with provision for the gears to slide on the shafts to permit the machine table to traverse, and the knee to be adjusted vertically for the required depth of cut. Spiral gears up to 45 deg. helix angle are hobbled by swivelling the machine table, and for gears of greater angle, a special swivelling hob spindle head is available, which is bolted to the machine column and driven from the main spindle nose. An attachment for manual indexing can be fitted to the work-head, which can then be used for normal dividing operations.

Fig. 13 shows a horizontal machine set up with an attachment for milling worms by means of a disc-type cutter. The right-angle spindle head is clamped to the machine column and driven from the main spindle, and an outboard support bearing

is provided for the cutter spindle. Rotation of the work at the required speed is effected by change gears from the table lead screw.

In addition, the company make a bevel gear milling attachment for gears up to 7 in. diameter, which can also be used on a shaping machine, and a fully-automatic indexing attachment for use on milling machines. The latter incorporates a cam mechanism for the traverse motion and is fitted with a workhead arranged to swivel to either a horizontal or a vertical position. A tailstock is provided to support horizontal work mandrels, and the attachment can be used for milling spur and bevel gears, ratchet wheels, and clutch members, for example. A work unit incorporating a 17-in. diameter horizontal indexing table is also available, which gives numbers of divisions from 20 to 480.

Attention may be drawn to a high-speed milling head which the company has introduced for carrying out die sinking operations. Handwheels with graduated collars permit both rotary and cross movements to be applied to the spindle head, which, in conjunction with the table and knee traverse motions, permit either male or female die forms to be produced. Six spindle speeds from 450 to 3,500 r.p.m. are available, and the vertical stroke of the spindle quill is 1½ in. The maximum circle of rotation for the cutter head is 5½ in. diameter.

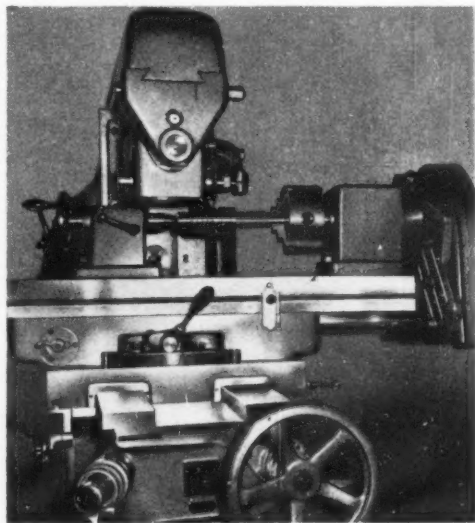


Fig. 13. Application of an attachment for milling worms on a Rigiva horizontal milling machine by means of a disc-type cutter

FEDERICI ULTRAELECTRIC COMBINED ULTRASONIC AND SPARK EROSION EQUIPMENT

Apparecchi Scientifici Federici, Milan (Airmec, Ltd., High Wycombe), who specialize in the fields

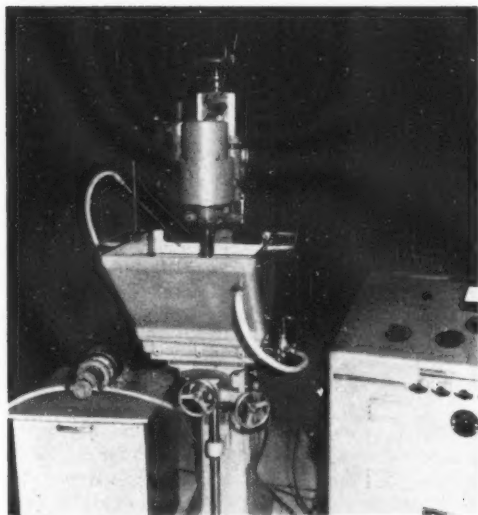


Fig. 14. Ultraelectric machine which combines the techniques of ultrasonic and spark-erosion machining

of ultrasonics and spark erosion, have developed a unit, shown in Fig. 14, which combines the principles of ultrasonic and spark-erosion machining and is claimed to afford a number of important advantages for operations on large workpieces of conducting and non-conducting materials. The Ultraelectric generator, seen at the right of the machine, enables ultrasonic and spark-erosion techniques to be employed in combination or separately, using the one electrode head on the machine, which incorporates both the transducer and electronic servo-feed mechanism.

Generator size is determined by the type of work required and a range providing output power from 750 W. to 6 kW. is available. Special electronic circuits of patented design provide ultrasonic vibrations to the spark electrode to permit work to be carried out almost by impact. The combination of spark erosion, which provides for rapid removal of material, and ultrasonic vibration applied through the transducer to the soft metal tool, is said to result in a very high degree of surface finish and accuracy of form.

It is stated that through holes of 10 to 20 mm.

diameter (0.4 to 0.78 in.) have been machined in material 30 to 40 mm. thick (1.18 to 1.57 in.) at a removal rate of 1.2 to 1.8 cu. in. per 10 hours. Work table and column units can be supplied to suit customers' requirements, and may be of the pillar type as shown, or arranged for bench mounting. Heavy-duty column and table units designed to take large workpieces can also be provided which may be arranged with servo-feed for the longitudinal and transverse movements, and form machining operations can then be carried out by traversing the work.

Other products of the company include ultrasonic drilling units from 800 to 3,200 watts rating, ultrasonic cleaning equipment, soldering equipment, and a wide range of instruments for the non-destructive examination of materials and for chemical and metallurgical processing.

Reliance Roller Pry Bar

The provisionally-patented Reliance roller pry bar here shown, has recently been introduced by Coley Bros. (Tools), Ltd., Birmingham Factory Centre, King's Norton, Birmingham, 30, and may be used, among other applications, for raising punch assemblies from the dies of press tools.

Available in 24-, 36- and 48-in. sizes, the pry bar incorporates a pair of freely-rotating rollers at the fulcrum, and a single roller at its left-hand end which makes contact with the punch assembly to be raised. With this arrangement, an unusually high thrust can be applied upwards to the punch assembly by downward movement of the bar, the right-hand end of which is fitted with a rubber hand grip. In consequence, punch assemblies of press tools up to the fairly large sizes can be raised by one man, using a pair of pry bars. Since only the rollers make contact with the punch assembly and die, the marking of machined surfaces is avoided. Heavy punch assemblies of very large press tools can be lifted by two operators, each using a 36- or 48-in. pry bar.



Reliance roller pry bar

New Techniques for Grinding Sintered Carbides

By E. ZMIHORSKI, M.Sc.

The problems associated with the grinding of sintered carbide, either in the form of cutting tools or tips, by means of silicon carbide, corundum, or diamond wheels, are well known, and such operations may involve high costs, also the possibility of craze cracking of the surface being ground. In this connection, moreover, it may be noted that the rapid rate at which the expensive grinding wheels are worn when operating on this type of material often accounts for a considerable proportion of the overall costs. In an attempt to alleviate some of these problems, experiments have recently been carried out with two new techniques, one of which is intended for rough grinding and high metal removal rates, and the other for finish grinding, carbides. The first method involves raising the temperature of the part to be ground to within 750 to 850 deg. C., and maintaining it at this temperature during grinding. It has been found that at this temperature the sintered carbides are considerably less brittle, and, consequently, less prone to craze cracking. Moreover, the hardness of the material is reduced to a point at which satisfactory results can be obtained by the use of corundum wheels, in contrast to more expensive types. In addition, important reductions in the times required to complete the grinding operations have been obtained as compared with those for conventional "low temperature" grinding.

From practical metal cutting experiments which have been carried out it has been noted that, for an average of four hours cutting time, a lathe tool which was ground by conventional methods could be operated at approximately 470 ft. per min. surface speed, whereas a similar tool which had been ground by the new high-temperature technique could be used at a cutting speed of 555 ft. per min. Other investigations have shown that with high-temperature grinding, the efficiency of cutting tools can be increased by as much as 280 per cent.

High-temperature grinding has been found to offer the greatest advantages when reclaiming tools which have suffered severe wear on the edges, with associated cracks and fractures, from which large amounts of material must be removed. The cost of re-grinding such tools by conventional methods may be so great as to be prohibitive, owing to the

time required to remove the damaged portions and the high rate of wear of the wheels. In one instance, a heavy-duty carbide-tipped lathe tool having a 5-mm. long fracture in the carbide tip was rough-ground by the high-temperature method in 30 sec., using a standard red aluminium oxide wheel of 26 grain size and 1 hardness, which was very much less than the estimated time for reclaiming a similarly damaged tool by the normal low-temperature method. According to the grade of the carbide, tests have shown that, for rough-grinding, metal removal rates may vary between 0.183 and 0.366 cu. in. per min.

In theory, if the temperature of a tool is raised to 750 to 850 deg. C. the adhesion between a brazed tip and the shank is likely to be destroyed, but in practice trouble has not been experienced in this connection. When grinding a tool to which the tip has been attached by low melting point brazing alloy, however, it is considered advisable to clamp the tool in the manner indicated in Fig. 1. This 2-point clamp secures both the shank and the tip, and the recommended ratio for the distances of the contact points on either side of the clamping screw is 15 to 1.

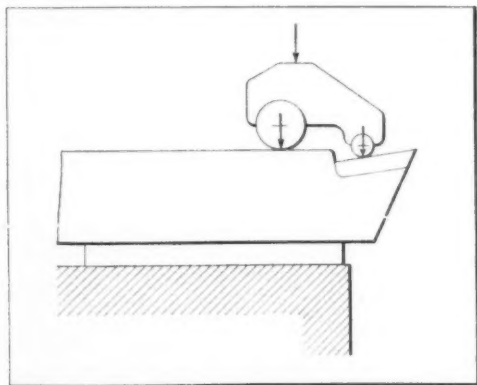


Fig. 1. When grinding a brazed carbide-tipped tool by the high-temperature technique a clamp of the type here shown may be employed, so that both the shank and the tip are securely held

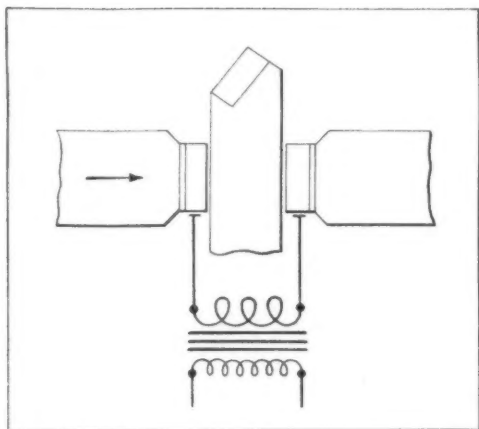


Fig. 2. Preferably, the heating equipment for raising the tool to the required temperature prior to and during grinding should be incorporated in the machine. This diagram shows a resistance heating set-up with a pair of insulated vice jaws

For certain types of carbide tools, including those of profiled form, the time required for grinding may be comparatively long, and it may then be necessary to make some provision for maintaining the tool at the required temperature, also for avoiding oxidation. To this end, a jet of burning coal gas, without air, can be arranged to play on the surface of the tool, to keep it at the required temperature and provide protection against oxidation.

For most normal tipped lathe tools, however, such supplementary heating is unnecessary, since, owing to the short time required for grinding, the abrasive friction is sufficient to maintain the pre-heat temperature.

The most effective method of pre-heating the tool prior to grinding is by induction, and equipment for this

purpose may be provided on the grinding machine. Alternatively, the tool may be raised to the required temperature in a furnace located adjacent to the grinding machine, or by insulated vice jaws incorporating a resistance-heating arrangement, as shown in Fig. 2. Advantage can also be taken of the heat which is applied to the tool when the tip is brazed in position.

SET-UP FOR HIGH-TEMPERATURE GRINDING

A diagrammatic view of a special machine for the high-temperature grinding of sintered carbide is shown in Fig. 3. The tool, as at A, is held in a swivelling, tilting vice, mounted on a table which is provided with T-slots in the working surface and arranged for movements in the longitudinal and transverse directions. Horizontal grinding is carried out with the corundum wheel at B, which is carried on a head that can be adjusted vertically by means of the handwheel C, and grinding in the vertical plane, with the wheel D. This wheel is mounted on a head which can be adjusted vertically on a column by means of the handwheel E. The wheels F and G control the transverse and longitudinal movements of the machine table, respectively. It should be noted that owing to the high rates of metal removal which can be obtained in high-temperature grinding, the horse-power of the electric motors used for driving the grinding wheels should be at least twice that required for conventional tool grinding.

As has already been mentioned, the high-temperature grinding technique results in a considerable reduction in the amount of grinding wheel wear, and apart from the economic advantages thus gained, there is a corresponding improvement in working conditions, since the amount of dust formed is proportionately reduced.

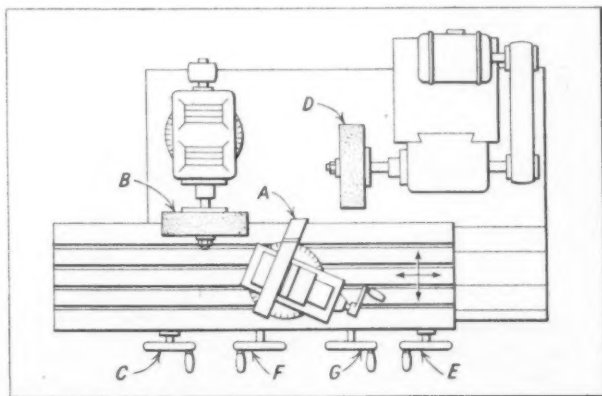


Fig. 3. Diagrammatic plan view of a special machine for grinding carbide-tipped tools by the high-temperature technique. There are two corundum wheels, at B and D, which are used for grinding in the horizontal and vertical planes respectively

FINISH GRINDING TECHNIQUE

The grinding technique just described is intended mainly for roughing operations, or where large amounts of stock must be removed, for example, to reclaim a badly-damaged tip. For finish grinding, an electrolytic process has been developed which involves the use of special silicon carbide or corundum grinding wheels with a metal bond. To manufacture these wheels, the abrasive grains are sintered with iron powder, the ratio of the two materials varying between 1 to 1 and 1 to 3, by weight. A D.C. electric circuit is set up between the workpiece (anode) and the grinding wheel (cathode) by a continuous flow of sodium silicate solution having a specific gravity of approximately 1.35 kg. per cu. dcm. This solution carries a current of the order of 24 volts, and an amperage of approximately 40 per sq. cm. of electrode area. The speed of the wheel varies between 2,750 and 3,500 ft. per min., and the pressure per unit area on the wheel during grinding is of the order of 8 to 10 kg. per cu. cm.

In operation, the electric current serves to heat the particles of metal to be removed and facilitates

the work of the grinding wheel. Tests carried out with this method have produced ground surfaces with a surface roughness of 0.15μ at metal removal rates up to 0.0025 cu. in. per min. Parts ground in this manner have a high surface finish, and show no signs of craze cracking. The absence of craze cracking suggests that this technique may be of considerable value for grinding such components as hardened gear teeth, ball bearing races, and high-speed spindles, for example. The longer life obtainable from the metal-bonded wheel, and the reduced cost, as compared with diamond wheels for instance, suggests that it may be economic to use the process for high-quantity production work, although it must be borne in mind that special grinding machines will have to be designed to enable the technique to be fully exploited.

It may also be noted that the metal bonded wheels have sufficient strength to permit operation at very high peripheral speeds, ranging from 12,000 to 29,500 ft. per min. With such speeds, it is believed, surface finishes of exceptional quality may be obtained, but it will be necessary to provide machines with suitable spindles and bearings before investigations can be carried out.

Inspecting the Bores of Long Tubes

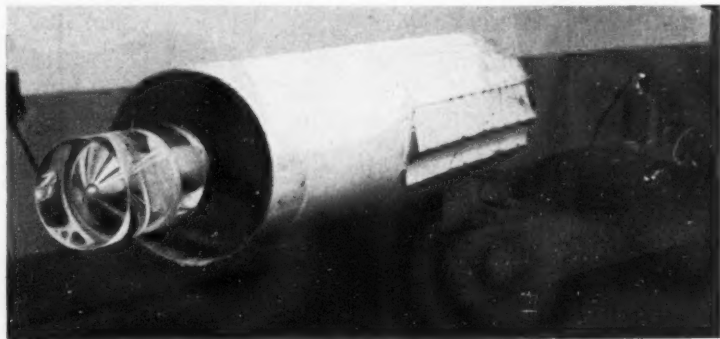
The Boeing Airplane Co., U.S.A., have recently developed a unit, as shown in the accompanying figure, to facilitate inspection of the bores of refuelling booms, as employed on the KC-135 jet tanker/transport aircraft. This refuelling boom is 25 ft. long, with a bore of about 5½ in.

A Lucite "lens," incorporated in the unit, is about 3 in. diameter by 2½ in. long, and is ground flat at one end and to a 70-deg. inverted conical form at the other. The "lens" is secured to a reflector holding a black light source, and this reflector, in turn, is mounted on a wheeled carriage which can be pulled through the boom. An infinite-focus micro-alignment telescope of 30× magnification is mounted at one end of the boom and

since the "lens" brings all light rays parallel to the line of sight, a 360-deg. panoramic sweep is obtained.

For checking a boom, the walls of the bore are flooded with penetrating oil containing a fluorescent material which lodges in any cracks or other defects in the surface. By means of the black light source, any such defects are then brought into sharp relief. The area illuminated at one time is about 2 in. long, and the unit is traversed through the bore in steps.

It is stated that a similar arrangement can be employed for inspecting components which have bores from ½ in. diameter upwards.



Special Equipment Developed for Inspecting the Bores of Long Tubes

Moore Universal Measuring Machine

The Moore Special Tool Co., Inc., Bridgeport, 7, Conn., U.S.A., who are well known as builders of jig boring and jig grinding machines, have now introduced a measuring machine of high precision which, in addition to incorporating universal features, provides capacity for handling the larger sizes of workpieces. Known as the type No. 3, it is arranged for floor mounting, as seen in the accompanying illustration, and the 11- by 24-in. table has a longitudinal travel of 18 in., and a cross travel of 11 in. A vertical adjustment, by hand, of 17 in. is provided for the spindle housing on the column, and the quill, in which the spindle may rotate or remain stationary, has a travel of 2½ in. The throat depth of the machine, from spindle centre to column casting, is 13½ in., and to the column ways, 10 in.

All the guideways are of hardened, ground and lapped steel fitted to hand-scraped seatings on the castings, and they are of prismatic section, which eliminates the need for adjusting gibs. Table positioning in the two directions of travel is accomplished by means of master lead screws fitted with graduated dials and verniers.

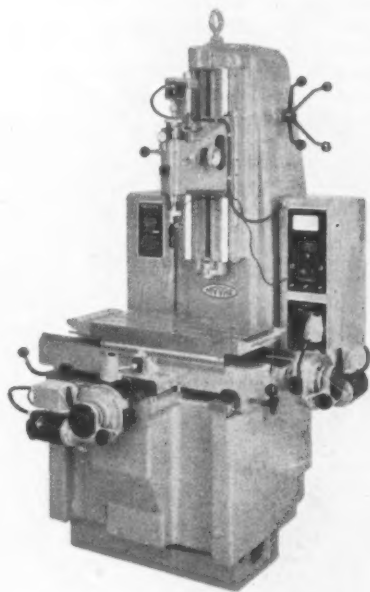
Power traverse, by means of built-in motors and reduction gearboxes, can be provided for the table and saddle, if required, as shown in the illustration, this arrangement ensuring the desirable smooth and uniform movement to the setting position. A relatively rapid rate of traverse, for moving the table or saddle to approximately the required position, is engaged by means of a selector switch on the panel mounted on the right of the machine column, and a slower rate is then brought into use by moving 2-position selector switches on control boxes adjacent to the traverse motors. This slower rate enables the operator to observe the table position with reference to rules graduated in 1/10-in. divisions.

The second position of the selector provides a slow traverse rate which permits the readings on the lead-screw micrometer dials to be observed, and when the table is within about 0.001 in. of the required position the power traverse is disengaged and final adjustment is made by rotating a small knob on the lead-screw gearbox, the latter providing a reduction ratio of 100 to 1. Scale reading is facilitated by an illuminated magnifier which is located above the dials.

In the building of the Moore jig boring and jig grinding machines the company have gained considerable experience in the production of precision

lead screws, and the master screws incorporated in this new No. 3 measuring machine represent a notable achievement. No corrector devices are employed in the system, and the lead screws run in solid nuts of aluminium bronze.

The screws are made of stabilised Nitalloy 135 steel, heat treated to produce a tough core, and hardened to Rockwell 70C. for a depth of 0.020 in. After the 29-deg. Acme threads have been finish ground, the screw is checked against a master lead-screw, which traverses a carriage mounting an electronic stylus gauge. The latter engages the pitch line of the screw being checked, which is directly coupled to the master screw and thus rotates in unison with it. A chart record is taken and errors at any part of the screw are then corrected by specially-developed hand lapping methods. The threads of the 2-in. long nut are produced by progressive tapping operations, and



Universal measuring machine introduced by the Moore Special Tool Co., Inc. For setting of the 11- by 24-in. table, lead screws of high precision are employed

the nut and mating screw are then run together for burnishing, using paraffin as a coolant, and a full bearing is thus obtained over the flanks of all the threads. One of the tests to which the finished screw and nut assembly is subjected involves rotating the screw relatively slowly, with the unbalanced nut in free engagement, and checking that the angle through which the nut is swung, by frictional contact between the threads, remains constant, within prescribed limits, as it moves along the screw. Signals obtained from electrical contacts, indicate the limits of swing allowed, and the test is repeated with the nut reversed on the screw.

With these screws and nuts, the error in any one inch of longitudinal or cross travel of the table is guaranteed not to exceed 0.000015 in. (15 millionths), and the maximum error in the total longitudinal or cross movement is within 0.000035 in. Squareness of the compound table movements for a 10 by 10 in. travel is stated to be within 0.00002 in., corresponding to one sec. of arc, and the straightness of longitudinal travel, vertically and horizontally, over the length of 18 in., is within 0.000025 in. Straightness of cross travel, over 11 in., is within 0.000015 in. The travel of the spindle is square to the table within 0.00003 in., and the spindle housing travel is square within 0.00005 in. Spindle rotation is true to 0.000005 in. (5 millionths), which enables the machine to be employed for checking roundness. The spindle rotates in some 400 specially-selected balls of a close-tolerance grade, which are retained in a cage and provide an interference fit of about 0.00015 in. between the spindle and the bore of the quill. Axial movement is eliminated by means of a preloaded ball thrust bearing also incorporating selected balls. The bearings are grease filled for life and lubricant seals are fitted to exclude dirt. Drive to the spindle is provided by means of a small motor directly coupled from above, which is supported on a bracket moving up and down with the spindle quill.

Each of the 500 graduations on the leadscrew dial represents 0.0002 in., and the vernier reads to 0.00002 in. The settings, it is stated, can be repeated to an accuracy of 0.00001 in. (10 millionths).

Measurement can be carried out by the use of either a universal microscope or an electronic stylus indicator mounted in the spindle, the indicator and associated electronic control panel being seen fitted in the illustration. This equipment is supplied by the Cleveland Instrument Co., U.S.A., and the stylus unit, which is of a specially-developed, compact design, will enter, bodily, holes of fairly small diameter, to enable measurements to be taken at considerable depths. The

stylus mounting arm provides a measuring capacity of 10 in. diameter, and the range can be increased by fitting an extension piece. A selector switch on the panel enables the scale reading of the meter to be changed from 0.0001 in. to 0.00001 in. per division, and, if required, a greater ratio of amplification can be provided, for example, 0.000002 in. per division. Sockets in the panel enable a chart recorder to be plugged in. The pressure of the stylus is very small, ranging from $\frac{1}{16}$ to $\frac{1}{4}$ oz. If desired, the stylus head can be removed from the spindle and attached to a machined face on the front of the spindle housing. There is also an abutment on the housing for locating slip gauges, which are used in conjunction with a dial indicator on the spindle quill, for making depth settings.

Accessories available include the Moore No. 2 rotary table which reads to one sec. of arc, and the No. 2 Micro-Sine tilting table.

Development of this measuring machine was begun some eight years ago, after Moore jig borers, without power traverse and spindle drives, had been purchased by several well-known firms in the U.S.A., to be used for measuring purposes. Very careful preparation was made at the outset, to ensure that the new machine should have a degree of accuracy adequate for the purpose. For checking of the table and cross-slide movements imparted by the lead screws, an 18-in. long master step gauge, of 1-in. step spacing, is employed in conjunction with an electronic stylus head. This step gauge was produced to an accuracy of 2 millionths of an inch, with reference to 18-in. master length bars, and it is of interest to note that, to provide a comparison check for accuracy, three 18-in. length bars, obtained from entirely different sources, were employed. One of these bars was produced in this country by the Coventry Gauge & Tool Co., Ltd., and checked by the National Physical Laboratory, and a second bar was made by the German firm of Hommelwerke. The third length bar was produced in the U.S.A., and checked by the National Bureau of Standards in Washington. In addition, a line standard produced by Hilger & Watts, Ltd., in collaboration with the N.P.L., is being used by the company.

The sole agents for the Moore Special Tool Co., Inc., in this country are Catmur Machine Tool Corporation, Ltd., 103 Lancaster Road, Ladbroke Grove, London, W.11.

EXPORTS OF MACHINERY (except electrical) from the Federal Republic of Germany during the first half of this year averaged D.M. 638.97 million per month. For the full year 1957 the average was D.M. 611.24 million.

Atlas Works of W. H. Allen Sons & Co., Ltd.

W. H. Allen Sons & Co., Ltd., acquired Atlas Works, Pershore, Worcs., in 1955, and have since installed many new machine tools of different types, including gear cutting machines which have been transferred from their main works at Bedford, to provide increased capacity for the production of Allen-Stoeckicht epicyclic gears, and parallel-shaft reduction gear boxes for marine and power station generators. These works, which were formally opened recently by Admiral Sir William Tennant, K.C.B., C.B.E., M.V.O., Lord Lieutenant of Worcestershire, are now in full operation, and are devoted entirely to the production of such gears.

Of cruciform shape, the works comprise a machine shop, which extends for the full length of two "arms," a gear cutting shop, and an assembly department and test bay. Works offices, inspection departments, and tool and finished parts stores are located at the centre of the cruciform. Although no major structural alterations have been made to the buildings since they were acquired by the company, wood block floors, and gangways of granolithic material have been laid throughout, and a new boiler house and heating system, also a new transformer room have been built. In addition, a loading bay has been provided, which has doors at each end to prevent wide temperature variations in the adjacent part of the machine shop, while loading and unloading of lorries is being carried out.

In the machine shop, heavy-duty machines are grouped in the central bay at one end, as shown in Fig. 1, and an overhead crane is provided to facilitate work handling. Machines in this section include a Lumsden 100-in. diameter rotary-table surface grinder, which is employed for machining

the joint faces of gear boxes, and obviates the need for a planer. There is also an electric annealing furnace for the stress relieving of workpieces with dimensions up to a 4-ft. cube. Light- and medium-duty machines, including centre and capstan lathes, milling machines, internal and external grinders, and borers, are installed in side bays at the other end of the shop, and separate electric hoists are provided for the loading and unloading of workpieces. In addition, there are two Avery electro-magnetic dynamic balancing machines, each of which has a capacity for handling components of weights up to 600 lb. It may be mentioned that coolant is supplied to nearly all the metal cutting machines in the shop by a centralized system.

Fig. 2 is a general view of the gear cutting shop, which occupies the southern arm of the cruciform. The largest gear hobber here installed is a 72-in. capacity David Brown Muir machine, which will cut gears to grade A limits. It is proposed to build an enclosure for this machine in order to provide closer control of the working temperature than is at present obtainable. Double



Fig. 1. A view of the machine shop at the Pershore works of W. H. Allen Sons & Co., Ltd.

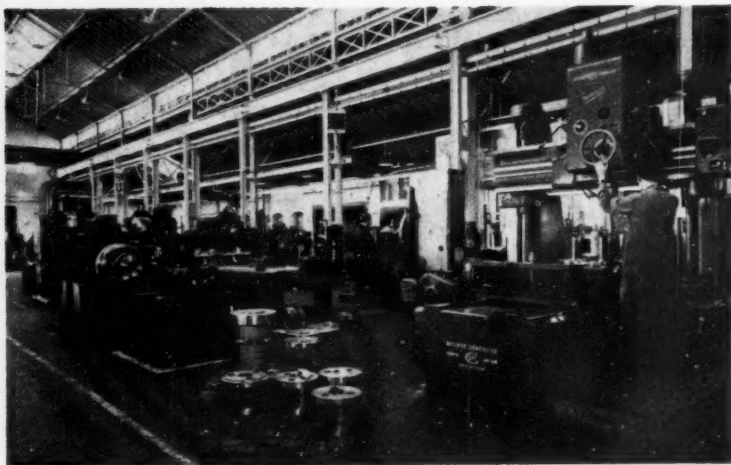


Fig. 2. A general view of the gear cutting shop. The Hydroptic 7 jig borer seen in the foreground is employed for precision boring and milling on a production basis

helical annulus gears and sun and planet wheels for the Allen-Stoeckicht epicyclic units are produced to a very high degree of accuracy on two Sykes 3C gear shapers, which were built to conform to the company's own specification, and provide for the cutting of both helices simultaneously. Other equipment installed in the shop includes gear shavers, two Maag gear grinders (Burton Griffiths & Co., Ltd.) and the Hydroptic 7 jig borer (Société Genevoise, Ltd.) seen in the foreground, which is employed for production purposes for the boring of planet wheel carriers, also high-accuracy boring and milling operations on other precision components.

All gears produced in this shop are closely checked in an adjacent well-equipped gear inspection department, and records are main-

tained which indicate the composition and hardness of the material used for each component, and give details of tooth profile, helix angle, pitch accuracy, and hardness after heat treatment of the finished product. Equipment provided for carrying out this work includes two Maag type PH.60 involute testers, Goulder No. 2 and No. 4 rolling gear testers, and a Hilger projector.

Gears for the epicyclic units are nitrided after they have been shaved, and no subsequent operation is performed, with the exception of honing the bores of planet wheels. Nitriding equipment for the treat-

ment of gears up to 20 in. diameter, and plant for lining bearings and facing journals on planet wheel spindles with white metal is housed in a separate building.

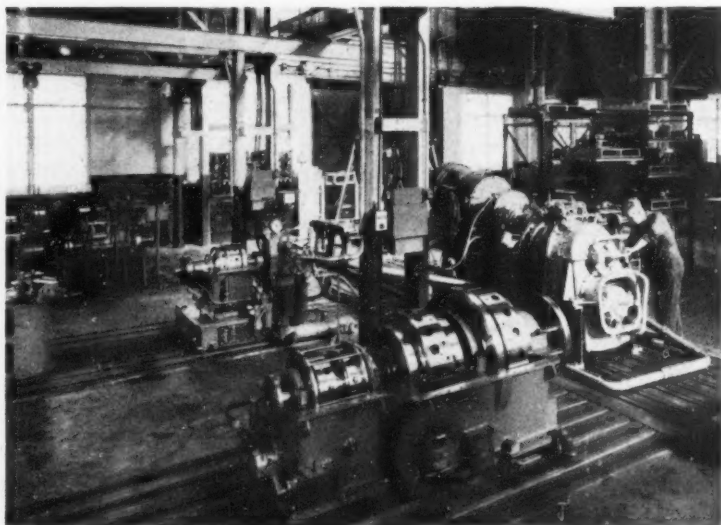


Fig. 3. Some examples of Allen-Stoeckicht epicyclic gears may be seen in this general view of the test bay

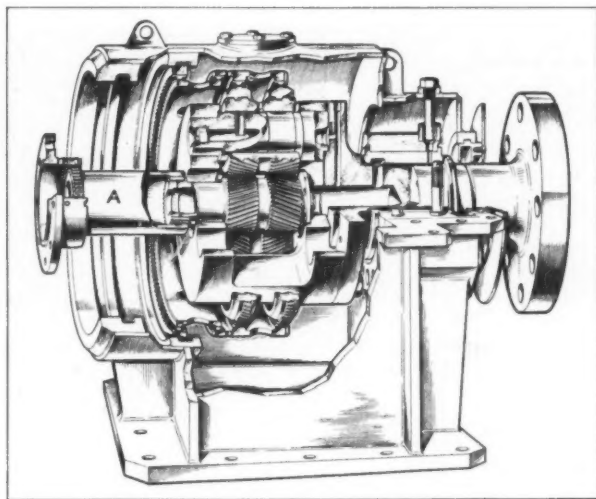


Fig. 4. A cut-away view of an Allen-Stoeckicht epicyclic gear

The northern arm of the cruciform houses the fitting and assembly departments, and the testing bay, a view of which is given in Fig. 3. D.C. driving motors with Ward-Leonard control are provided for running the gear units at steplessly-variable speeds for testing purposes, and a small-capacity, high-speed, water brake is available for applying light loads to the gears during tests. In the foreground may be seen an Allen-Stoeckicht 2-speed, double-reduction epicyclic gear for a mine tunnelling machine. Capable of transmitting a maximum of 110,000 lb.-ft. torque, this gear box is intended for use with a 160-h.p. motor, to provide speeds at the output shaft of 24, 18, 12 and 9 r.p.m. It will give an overall speed reduction ratio slightly exceeding 80 to 1, and the largest annulus gear which is incorporated has a diameter of 30 in. The unit is 6 ft. long overall, and weighs $5\frac{1}{2}$ tons.

DESIGN FEATURES OF ALLEN-STOECKICHT GEARS

Allen-Stoeckicht epicyclic gear units are made by the company under licence from Germany for both speed reduction and speed increasing duties, in a wide range of sizes with capacities for transmitting from about 10 to more than 10,000 h.p., to provide shaft speeds from a few revolutions per min. to 45,000. A gear unit at present being built is destined for Canada, and will form part of an 11,000 h.p. motor driven compressor plant. Other gears have been supplied by the company for

power station and marine main propulsion and generator drives.

As already indicated, the gears are of the double helical type, and from Fig. 4, which shows a cut-away view of a typical single-stage epicyclic unit, it will be noted that the sun wheel shaft has no bearings but is supported by the planet wheels. It is connected to the high-speed shaft, whereby the drive is transmitted to the unit, by gear-type couplings and the sleeve A. Separate helical annulus gears, of opposite hand, mesh with the planet wheels, and are housed in a ring which, in turn, is supported in the body by a second ring. These rings are connected to each other and to the annulus gears and the body by gear-type couplings, and end thrust is taken by ring clips. This arrangement provides a degree of flexibility which ensures that uniform contact pressure is obtained between each planet wheel and the sun and annulus gears. In consequence, equal loads are transmitted by all the planet gears when the unit is in operation. Another feature of the design is that, since the sun wheel shaft and planet wheels can move freely, endwise balanced loading is obtained on the two portions of the helical gears.

POLYTHENE PACKAGING APPLICATIONS—Portable pneumatic and electric tools, also their associated spares, manufactured by Desoutter Brothers, Ltd., are now being packed and sealed for despatch or storage in polythene bags supplied by Spesco Developments, Ltd., Chertsey, Surrey. The bags, of which 14 different sizes are used, have a printed panel on one side, and since the material is transparent the need for attaching identifying labels has been eliminated. The users have installed a heat sealing machine in their despatch department, to close the open ends of the bags, and it is stated that the overall packaging time for these items has been reduced by 50 per cent, compared with the previous method which involved wrapping them in heavily-impregnated grease-proof paper.

Polythene is also being used for packaging purposes by The de Havilland Aircraft Co., Ltd., Hatfield, and in this instance the material is supplied by Spesco Developments, Ltd., in tubular form, wound on to a reel. The user company's name and trade mark is printed at regular intervals along the tube, which is cut to length to suit individual components and, finally, heat sealed at each end.

Dawson Universal Milling Arbor

Edward Dawson (Engineers), Ltd., Church Avenue, Sawley, near Long Eaton, Nottingham, have recently introduced a patented universal milling arbor (world patents pending) known as the Uni-Arbor. This equipment enables practically any standard cutter, or combination of cutters, to be rapidly set-up or changed, on all types of machines provided with any of the standard spindle nose tapers, including horizontal and vertical milling machines, horizontal borers, and tool and cutter grinders. Among tools that can be set-up in this way may be mentioned drills, reamers, face mills, end mills and shell mills, and complete cutter gangs for horizontal milling. The versatility of the equipment is, in fact, such that, on a horizontal milling machine, for example, a complete machining sequence can often be carried out, with the work in the same setting throughout. Cutter-changing, in any desired order, can be effected in 30 to 60 sec. or less, according to the nature of the set-up.

Some examples from the range of simple interchangeable components which form the basis of the Uni-Arbor system are shown in Fig. 1. The "base-arbor" A normally remains in the spindle nose, to which a pair of dogs is attached by means of screws. These dogs project through the slots B

in the base-arbor, and prevent it from rotating in the spindle nose taper. The various cutters are mounted in the base-arbor by means of interchangeable "inserts," examples of which are seen at C, D and E. When a large heavy-duty facing cutter is required, it is mounted on the parallel spigot seen projecting from the base-arbor, and the dogs on the spindle nose engage slots in the cutter body. An insert with an integral collar, and a shank that accurately fits the bore of the base-arbor, is inserted in the latter, and tightened through a drawbar system, by means of a nut at the opposite end of the spindle, to secure the cutter.

A cutter with a bore-diameter smaller than the base-arbor spigot is mounted by means of an insert with a locating diameter that fits the cutter bore, and a double-sided dog-type driver is interposed between the cutter and the base-arbor spigot. The dogs on one face engage the slots in the cutter, and those on the other side, the slots F in the base-arbor spigot. Three typical drivers are seen towards the bottom right in Fig. 1. By employing a suitable insert, the cutter set-up can be "compounded," by mounting one cutter on the base-arbor spigot, and one or more on the locating diameter of the insert, with drivers interposed.

All inserts are ground accurately concentric, within 0.0003 to 0.0005 in., total indicator reading.

The range of inserts includes both solid and hollow types, and examples of the latter are seen at D and E. These hollow inserts are designed to hold standard taper-shank tools such as drills, reamers, end mills, and shell reamers, and are available with cutter-locating

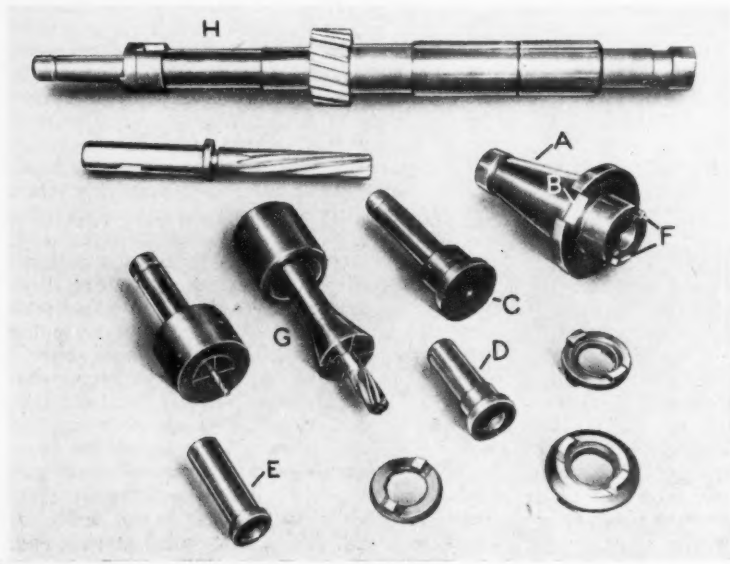


Fig. 1. Simple interchangeable components of the type here illustrated form the basis of the Uni-Arbor system

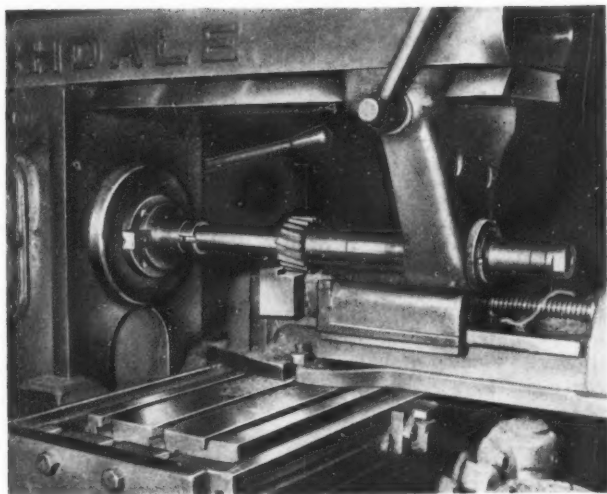


Fig. 2. Typical set-up on a horizontal milling machine, utilizing the arbor seen at H in Fig. 1

for securing the inserts, and are available in various sizes, for cutters down to $\frac{1}{8}$ in. diameter.

For more conventional set-ups on horizontal milling machines, for example, for gang milling, arbors of the type seen at H are available in sizes ranging from 1 in. to 2 in. diameter. These arbors are, in all respects, equivalent to the standard type, except that the shank portions are similar to those of the inserts. A cutter-gang can thus be mounted on an arbor of this type, and set-up on the machine, or removed from it, as a single unit, without the necessity

for releasing the clamping nut or disturbing the spacing collars. Repeatability of a high order is ensured, and advantage may also be taken of this feature by regrounding certain types of diameters. The example D is of the latter type, and by employing inserts of this design, taper-shank tools may be incorporated in "compound" set-ups. Provision is made for mounting parallel-shank tools by means of adapters and split collets, as seen at G. The adapter is counterbored at the rear end, for accurate location on the base-arbor spigot, and the opposite end has a conical bore to suit the collet. These collets, which can also be incorporated in compound set-ups, are tightened by the drawbar system used

for releasing the clamping nut or disturbing the spacing collars. Repeatability of a high order is ensured, and advantage may also be taken of this feature by regrounding certain types of

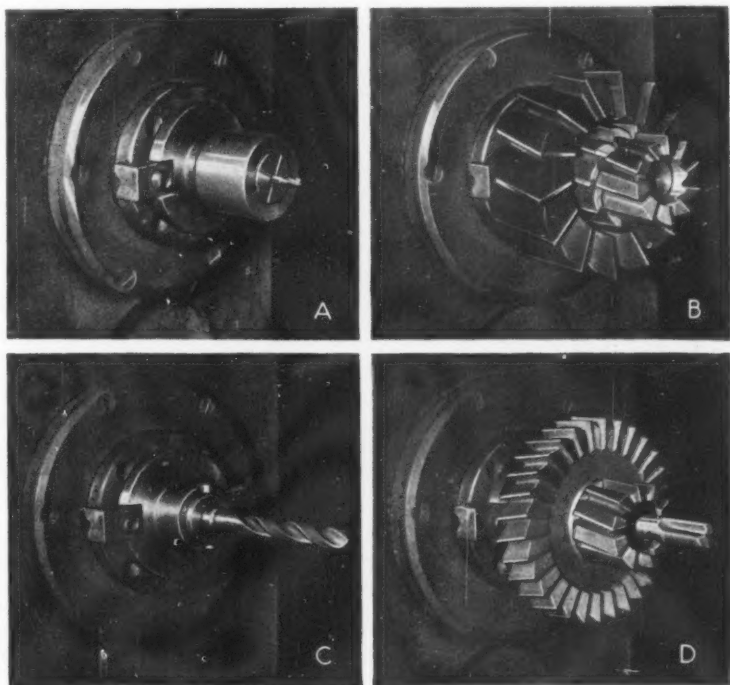


Fig. 3. Typical cutter set-ups that can be obtained on a horizontal milling machine. A— $\frac{1}{8}$ -in. diameter end mill in collet and adapter; B—compound assembly of a large face mill and two smaller cutters; C—drill, held in a hollow insert; D—compound set-up incorporating a slotting cutter

cutters without removing them from the arbor. Similarly, other types of cutters can be ground on the inserts used for setting them up on the machine, so that high accuracy for squareness and concentricity is obtained. A typical set-up, utilizing the arbor seen at *H*, is shown in Fig. 2. Boring bars, designed for mounting in the base-arbor in the same manner, are also available.

A series of illustrations, showing some of the various ways in which the Uni-Arbor can be employed on a horizontal milling machine, is given in Fig. 3. At *A* is seen a $\frac{3}{8}$ -in. diameter end-mill set-up in a collet and adapter, and *B* shows a compound set-up comprising a large face mill, and two additional cutters, clamped by a solid insert.

The application of a hollow insert, for holding a drill, is illustrated at *C*, and *D* is a typical compound set-up, also with a hollow insert comprising

a shell end mill, a slotting cutter, and a side and face cutter. For set-ups of this type, it may be noted, inserts with adjustable screw collars are available, for controlling the slot-depth/face relationship.

In certain respects, the Dawson Uni-Arbor resembles the Stieber type 333 arbor, produced by Stieber & Nebelmann, Munich, in which the insert is retained and locked by means of a socket-head screw, at the front of the assembly. An agreement was recently made between the two companies, under which Edward Dawson (Engineers), Ltd., will produce the Stieber 333 arbor in this country, and Stieber & Nebelmann will produce the Uni-Arbor in Germany, on a reciprocal basis.

Birfield Tools, Ltd., Bodmin Road, Coventry have been appointed sole selling agents for the above equipment.

Profile-turning Bevel Pinion Shafts

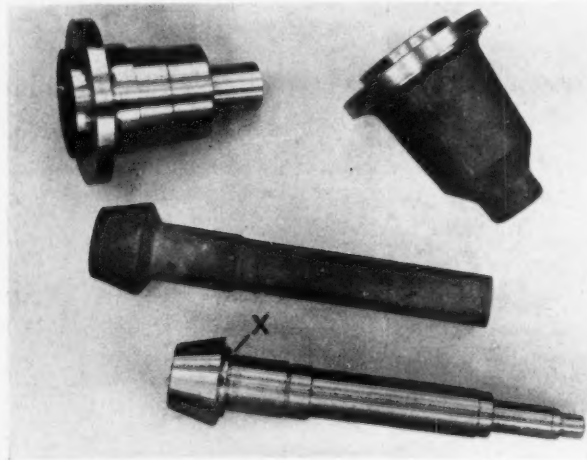
A description of the C-R type P.5 multi-tool and profiling lathe recently developed by Churchill-Redman, Ltd., Parkinson Lane, Halifax, was published in MACHINERY, 92/570—7/3/58, and subsequent reference was made to this machine when it was demonstrated at the Birmingham showrooms of the distributors, Charles Churchill & Co., Ltd. (MACHINERY, 93/624—10/9/58).

The accompanying illustration shows two components which were machined on lathes of this type at another recent demonstration held at the

Halifax works. For the bevel pinion shafts, of En. 34 steel, two set-ups were employed, and at the first stage, the head of the forging was held in a 3-jaw chuck and the opposite end was supported by a tailstock centre. The shaft portion and the rear of the head were profile-turned, three cuts being taken at the small diameter end. When the copying tool reached the point *X* during the third pass the speed was automatically reduced from 1,200 to 600 r.p.m. At this point, also, the rear auxiliary slide was advanced to produce two of the relief grooves in the shaft. The feed rate for this stage was 0.014 in. per rev., and the cycle time for the first set-up, 1 min. 40 sec.

For the second set-up, the component was reversed and the small diameter end was inserted in a sleeve which provided for axial positioning from a shoulder. A spring-loaded centre was employed in conjunction with this sleeve, and the chuck jaws were applied to the work through equally-spaced holes in the sleeve walls. With this set-up a single copy-turning cut was taken over the taper surface of the head at a speed of 600 r.p.m. and a rate of feed of 0.014 in. per rev.

In addition, the remaining relief grooves were cut by tools in the rear auxiliary slide at a feed rate of 0.005 in. per rev. This second stage was completed in a cycle time of 45 sec.



Components machined at a recent demonstration of Churchill-Redman type P.5 multi-tool and profiling lathes

The Engineering Department of the Mullard Radio Valve Co., Ltd.

The Engineering Department of the Mullard Radio Valve Co., Ltd., at Mitcham, Surrey, was formed very early in the firm's history, since it has always been the policy to undertake the design, development, and construction of special plant required for production purposes within the organization. Briefly, the functions of the Department can be defined as the design and construction of new plant for the production of valves, transistors (and other semi-conductor components), television and instrument tubes, X-ray tubes, and magnetic ferrites; the development or modification of existing machines and equipment for adaptation to new processes, also the major overhauling of plant; routine maintenance; and the training of apprentice engineers for such work. The Department at Mitcham caters for that plant, also for the company's factories at Waddon, Whyteleafe, and Hove, and functions in close co-operation with similar Departments in the remaining three main plants in the Mullard organization, namely, the receiving valve plant at Blackburn, the television tube plant at Simonstone, and the transistor plant at Southampton.

The Mitcham Engineering Department provides employment for nearly 300 people and has recently been moved to a new shop, a general view of which is shown in Fig. 1. In the foreground can be seen the lathe section of the toolroom, with the milling section adjoining. Next in line, down the shop, there is a Newall jig borer, and the succeeding sections are devoted to a battery of capstan lathes, for small-batch production work, and to the erection of special purpose machines and equipment. At the far end, are installed a Webster & Bennett vertical boring mill and an

Asquith radial drilling machine. At the extreme right, under the first floor, may be seen a corner of the enclosure surrounding the grinding section, and the remainder of the shop on that side is devoted to the production and maintenance of press tools, of which a wide variety are made. These tools, which are made for both hand and power operation, range from simple punching and cropping types, to multi-stage progression tools, for as many as 18 different operations.

In the construction of these press tools, extensive use is made of tungsten carbide inserts, which are spark-eroded on an Eleroda D1 machine (Rockwell Machine Tool Co., Ltd.). Considerable increases in working life of tools have been achieved by incorporating these inserts, and this point is well illustrated by the tool seen in Fig. 2, where a section of the strip is also shown. This tool is employed for blanking the anode seen immediately in front of the strip, which is required in large quantities for five different types of valves. The anode is blanked from nickel iron, 0.005 in. thick by approximately 1½ in. wide, which is annealed,



Fig. 1. General view of the new shop which has been provided recently for the Engineering Department of the Mullard Radio Valve Co., Ltd., Mitcham. The building also houses the design, planning, and purchasing offices

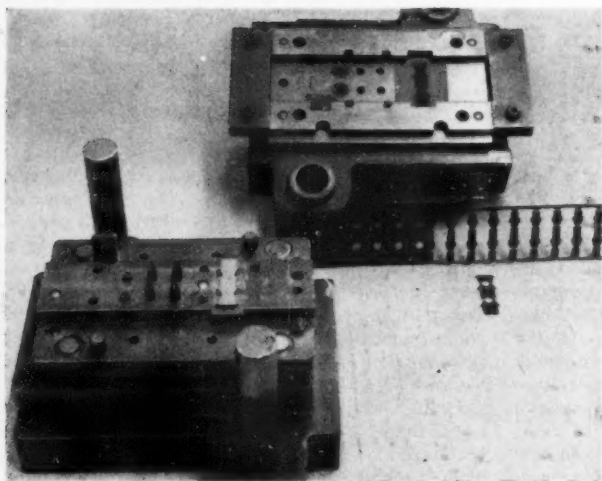


Fig. 2. This press tool is used for blanking anodes from nickel iron strip and incorporates tungsten carbide punches and dies produced by spark-erosion. The tool will blank a complete batch before it requires to be re-serviced

sand blasted and carburized on both sides, and the abrasive properties of this material are such that with the high-speed steel punches and dies originally employed the tool produced only 10,000 parts on the first run before re-servicing was required. During the second run, 5,000 satisfactory parts were blanked, and it was found that for subsequent runs this latter figure was progressively reduced.

With tungsten carbide inserts and punches, however, the complete production requirement of parts per batch can be achieved, without interruption, in one run, and although the tool is re-serviced after this number has been produced, it is believed that a considerably larger number could be blanked before it received attention. At the first stage, a cropping operation is performed on one edge of the strip, and at the next station, two 5-mm. holes are pierced for location purposes. The next three stage are idle, and at the sixth position the component is blanked, as shown.

The blanking punch for this tool was ground on a Wickman Optical Profile grinder, installed in the grinding section, and the die was spark-eroded on the Eleroda machine already mentioned. For this operation, roughing and finishing electrodes were employed, both of K.E. 672 steel (Kayser, Ellison & Co., Ltd.), the time required for roughing the die, which is nominally $\frac{1}{4}$ in.

thick, was 12 hours, and for finishing, 6 hours. Spark-eroded punches and dies are consistently produced within 0.0002 in. of the required size, and a surface roughness of an average of 12 micro-in. is obtained. For certain tools, it is the practice of the company to spark-erode the punch from tungsten carbide, and then to use this punch as an electrode for spark-eroding the die. The punch is made of greater length than is finally required, so that the eroded end can subsequently be removed.

Prominent in the new premises is the drawing office, which hitherto was housed in a department some distance from the toolroom. The new office is exceptionally well designed, to give the best possible working conditions, with ample natural and artificial lighting. Each draughtsman has a Hamburg-size board, mounted on a Nike fully-adjustable hydraulic stand, and equipped with a draughting machine. Adjacent to the drawing office is the printing and filing section, and it is interesting to note that the

company is adopting the vertical plan filing system in preference to horizontal filing in plan chests, with substantial savings in floor space. In order to reduce, as much as possible, the time required to produce the drawings for tooling and special equipment it has always been the company's policy to take advantage of the wide range of standardized components which are available from outside sources. To this end, three showcases have been installed at one end of the drawing office in which are displayed such equipment as typical air cylinders, micro-switches, bearings, components for die sets, and a range of the natural and synthetic materials which are available from the rubber and plastic industries, for example. The contents of the cases are added to, and kept up to date from time to time, by the suppliers concerned, and this system has not only proved very convenient as a means of keeping designers in touch with the latest developments, but may permit important savings in the time required to select a suitable item for incorporation in a design, since the need to search through catalogues is reduced or, in some cases, eliminated entirely.

STOCKS OF COAL, distributed and undistributed at the end of September, totalled 34,003,000 tons, compared with 27,912,000 tons 12 months earlier.

British-built McKay Machines

As reported in MACHINERY, 93/914—15/10/58, a new company, known as Vickers-McKay, Ltd., has been formed jointly by the McKay Machine Co., Youngstown, Ohio, U.S.A., Vickers-Armstrongs (Engineers), Ltd., and the Rockwell Machine Tool Co., Ltd., and the range of McKay machines will be made in this country by Vickers-Armstrongs. In addition, the design and construction of equipment for handling, forming, or processing coiled material, to customers' special requirements, will be undertaken.

The McKay Co. supply complete lines for handling coiled material from 24 to 108 in. wide, and the equipment is designed to feed the material at high-speed into either a guillotine or a blanking press. Such a line comprises three inter-connected units arranged to uncoil and feed pre-set lengths of material. Various types of coil holders are available, and

equipment can also be incorporated for washing and cleaning the material. A typical McKay installation was described in MACHINERY, 92/1432—20/6/58, in an article concerned with the new

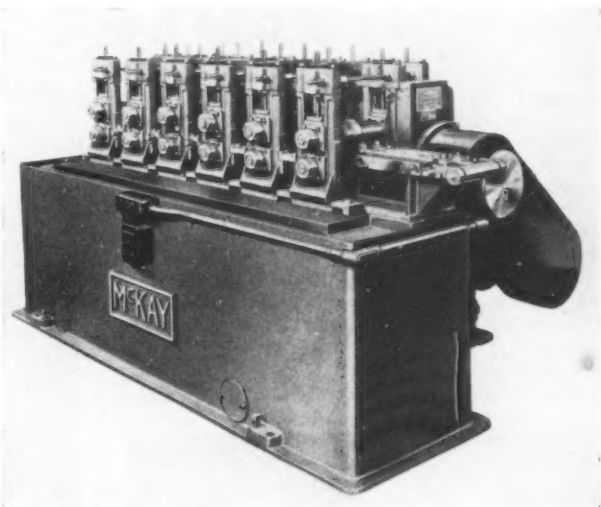


Fig. 2. A McKay strip-forming machine from the range now being built in this country. These machines are suitable for forming flat strip into a wide variety of shapes

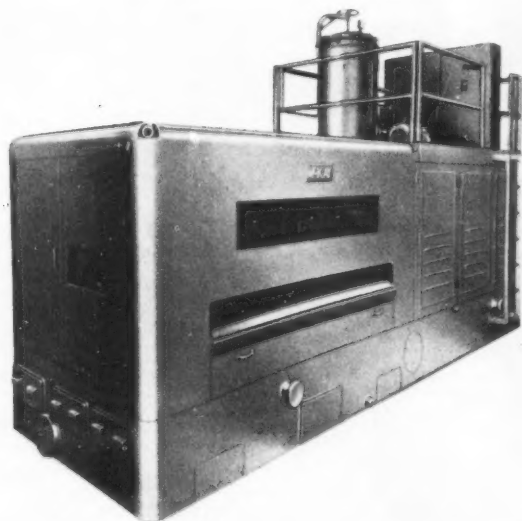


Fig. 1. (below) An example from the range of McKay steel sheet flexing machines being built in this country

press shop at the works of Vauxhall Motors, Ltd., Luton.

In Fig. 1 is shown a typical example from the range of McKay steel sheet flexing machines, which are also to be built in this country. These machines are designed to "temper" sheet steel temporarily by subjecting it to a flexing process, to facilitate the deep drawing of materials which otherwise might not be suitable for such operations. The McKay equipment also includes complete cutting-off lines, incorporating swivelling, flying, or rotary shears, and such lines are available for various widths of material, and thicknesses up to $\frac{1}{4}$ in.

Ranges of square-tube- and strip-forming machines are to be built, and an example of the latter type of machine is shown in Fig. 2. The machines in this range are suitable for forming flat strip into a wide variety of shapes, and can be employed for a large number of different materials.

Other McKay products include shear and butt-welding machines, for preparing the edges of steel sheets and joining them with a full-width weld. Such machines can be incorporated in a line for continuous processing of sheet steel, and can be operated in conjunction with continuous uncoiling

equipment. In addition, there are cutting-off machines for pipes, tubes, and formed sections, and draw benches, for bars and tubes, which can be supplied for operations on a maximum of three workpieces simultaneously. The McKay Co. also build a number of special-purpose machines for bending and profile-rolling motor car wheel rims, together with circling and bending machines for the production of a wide variety of components.

British-built McKay equipment will be marketed in this country by the Rockwell Machine Tool Co., Ltd., Welsh Harp, Edgware Road, London, N.W.2.

Churchill-Curtis Abrasive-belt Grinding Machines

By arrangement with the Curtis Machine Corporation, Jamestown, U.S.A., and The Carborundum Co., Ltd., Manchester, Churchill Gear Machines, Ltd., Blaydon-on-Tyne, Co. Durham, are now making abrasive-belt grinding machines. Two machines built at Blaydon-on-Tyne are here illustrated, the type 304C being shown in Fig. 1, and the type 600C in Fig. 2.

The former is a conveyor machine for grinding,

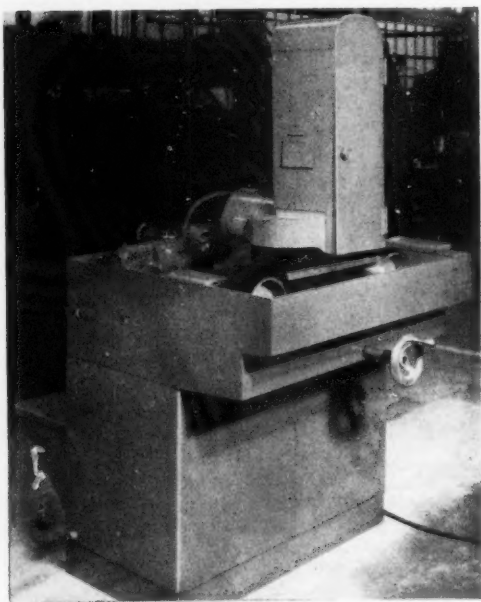


Fig. 1. Churchill-Curtis Type 304C conveyor-type abrasive-belt grinding machine

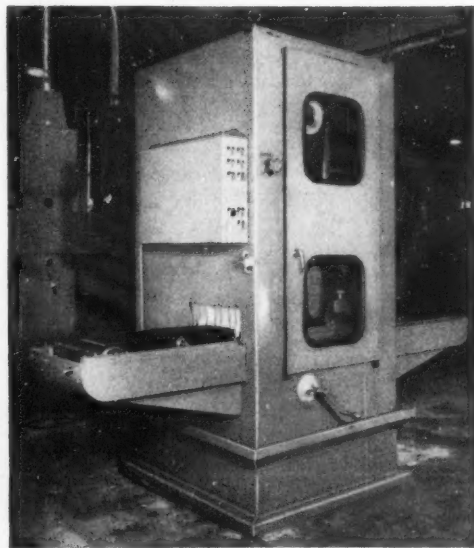


Fig. 2. Churchill-Curtis Type 600C conveyor-type abrasive-belt grinding machine

polishing and deburring work up to 4 in. wide by 2½ in. thick. It can be supplied as a bench unit, for dry grinding, or can be mounted on a sheet-metal pedestal, and equipped with suds pump and piping for wet grinding, as shown. Designed for high output, the machine will grind ferrous and non-ferrous metals, also plastics, stone, wood, glass and other materials. Precision adjustments facilitate rapid change over from one job to another, and a magnetic work-holding fixture is available, if required, for iron and steel com-

ponents. Units can be arranged in series to perform multiple grinding and polishing operations with only one handling of the components.

On the larger, 600C, machine, which has similar features, the work capacity is 10 in. wide by 4 in. thick for bars, blanks and other parts. The unit is completely enclosed and all controls are easily accessible.

Charles Churchill & Co., Ltd., Coventry Road, Birmingham 25, are the sole distributors of these machines.

G.I.E.C. Activities

Since the Gloucestershire Industrial Education Council began its activities on a small scale just over 3½ years ago, it has received encouragement and support for its aims from educationalists and industrialists not only in Gloucestershire but also in other parts of the country. Briefly, the purpose of the Council is to act as a link between schools and industry by "fostering and promoting education for industry with particular emphasis on engineering as part of the school curriculum." Composed of experienced industrialists, the Council endeavours to bring to the notice of boys and girls of school age the rewarding and satisfying careers to be found in many branches of industry vital to the economic future of the country.

Financial backing for the scheme has so far been provided mainly by nine member firms, but with the gradual increase in the scope of the Council's activities, it is now hoped that many of the remaining 60 firms—both large and small—which operate within the county boundaries will give additional support. The present chairman and members envisage the transformation of the organization into a larger association comprising all or most of the industrial undertakings in Gloucestershire, which would from time to time elect a council responsible for shaping policy. Although the Council has accomplished much since its inception, there remains a number of important tasks to be performed, for example, the establishment of a local group apprentice training scheme which would enable small firms with limited financial resources to provide adequate training facilities. On many occasions it has been possible to arrange for member firms to release qualified men from their normal duties to make instructional visits to schools and colleges.

A recent innovation has been the establishment of a technical library at the G.I.E.C. offices, 8 Lansdown Place, Cheltenham, where a selection of modern books likely to be of assistance to potential engineers is available for the use of pupils

attending schools in Gloucestershire. The books provided by this library are not normally purchased by or obtainable in schools. A newsletter is also circulated to schools in the county as a means of disseminating information concerning the Council's activities. The stimulation of pride in craftsmanship is another aim, in pursuit of which a competition was recently organized for apprentices of different grades attending schools and engineering establishments.

Evidence of the interest being shown in its work was afforded by the attendance, at a recent conference held by the Council in Cheltenham, of more than 200 delegates from schools, colleges, research establishments and industry, who listened to addresses by prominent people connected with education and industry. The proceedings lasted for two days and included discussion periods. In addition, a number of short films based on technical subjects was shown.

During the period of the conference, an exhibition, organized by the Council, was staged, for the purpose of portraying the wide range of industries at present established in Gloucestershire. Held in tented structures adjacent to the conference hall, the exhibition attracted much interest, particularly among scholars and younger members of the community, who were able to seek advice from representatives attending the stands as to the various ways of starting a worth-while career in engineering. Examples of work produced by apprentices at different stages of their training were a prominent feature of the exhibition, which was also noteworthy for the high proportion of apprentices included among the stand attendants. An interesting stand provided by the technical colleges of the county was designed to show the extent to which technical education is available in the area.

The chairman of the G.I.E.C. is Lt.-Gen. Sir John Evetts, C.B., C.B.E., M.C. (Rotol, Ltd., and British Messier, Ltd.), the remaining members being Sir George Dowty, F.R.Ae.S., M.I.Mech.E. (Dowty Group), Sir Roy Fedden, M.B.E., D.Sc., M.I.Mech.E. (Consulting Engineer), Mr. C. A. W. Bird (Thos. Bugbird & Son, Ltd.), Mr. H. Burroughes, F.R.Ae.S. (Hawker Siddeley Group), Mr. A. O. R. Johnson (T. H. & J. Daniels, Ltd.), Mr. F. J. Fielding, M.I.Mech.E. (Heenan Group), Mr. K. J. Hume, B.Sc., M.I.Mech.E. (Dowty Group), Mr. G. C. Roberts, M.Sc., A.F.R.Ae.S. (S. Smith & Sons), Mr. K. W. Watson, A.R.Ae.S. (Armstrong Siddeley), Mr. S. O. Peebles, A.R.Ae.S. (Rotol, Ltd., and British Messier, Ltd.), Mr. A. Palmer (Telehoist, Ltd.), and Mr. A. D. P. Tallents (Impregnated Diamond Products). The Secretary to the Council is Mr. G. T. Page, M.A., 8 Lansdown Place, Cheltenham.

News of the Industry

Halifax

GEORGE SWIFT & SONS, LTD., Claremount, have now completed and occupied their office extensions and good progress is being made with the new 250- by 50-ft. heavy lathe erection shop which, it is hoped, will be in operation by the end of the year. Two Vaughan 25-ton overhead electric travelling cranes are to be installed. Orders are in hand for standard lathes ranging from 8½- to 27-in. centres, also for a number of special-purpose types. The latter include 21-in. centre lathes for machining electrodes, which are equipped with special duplex milling heads for taper boring and thread milling; 24- and 36-in. swing, hydraulically-operated, face copying lathes; 12½-in. centre lathes for turning and boring operations on valves and valve taper discs and inserts; and 16- and 19-in. centre lathes with faceplate drives for machining titanium. Export markets for lathes include South Africa and India.

OLDFIELD & SCHOFIELD CO., LTD., Boothtown, are occupied with the production of standard lathes ranging from 12½- to 24-in. centres, and we may note that orders are in hand for 4-ft. carriage and wagon wheel lathes for Australia, and for axle journal turning lathes, equipped with grinding heads, for British Railways. We hope shortly to describe one of the latter machines. Other work in progress includes straightening presses up to 60 tons capacity.

JOHN STIRK & SONS, LTD., Boothtown, have a good order book for double-standard and openside-type planing machines, the former ranging in size from 3 to 10 ft. wide, and the largest having a 20-ft. stroke, and a planing capacity up to 8 ft. high. Openside-types include a number of machines for planing 6 and 7 ft. wide. Some of these planers are destined for British Railways workshops and for Australia and India. A 10-ton per hour cupola has been installed in the foundry to supplement the output of the previously available 5- and 6-ton sizes.

COVENTRY MACHINE TOOL WORKS, LTD., Boothtown, are steadily engaged in the production of Covmac horizontal hot forging machines, the sizes in hand ranging up to 3-in. bar capacity. Another of the firm's fully-automatic forging machines is in progress, and is destined for Australia.

S. APPLEYARD & Co., Boothtown, who are

experiencing a somewhat reduced demand for their normal ranges of single- and double-ended punching, shearing, and angle cropping machines, and bar croppers, are carrying out reconditioning of plate- and bar-working machinery of various types, and supplying spares, such as punches, dies and shear blades.

DENHAM'S ENGINEERING CO., LTD., Holmfild, whose standard lathes range from 17 to 41½ in. swing, are at present also building lathes of 45- and 47-in. swing, and some of the lathes in progress are being provided with copying equipment. Demonstrations of the 20½-in. centre lathe for profiling Doxford marine diesel engine piston heads, as supplied to Swan, Hunter & Wigham Richardson, Ltd., Newcastle-upon-Tyne, and described in MACHINERY, 93/734—24/9/58, have been held, for North of England and Scottish engineers, at the Tyneside works. Machines recently ordered have included two SR8v 17-in. swing lathes for turning copper billets, and two similar lathes, for surfacing and boring operations, are destined for Scotland and South Africa. We may also note orders for four special lathes for turning graphite electrodes from 3 to 30 in. diameter, and the jointing nipples. There are two sizes of electrode lathes and two sizes of nipple lathes. The nipples are of double-tapered form and pneumatic operation is provided for the feeds, tailstocks, and chucks on these lathes. On the smaller nipple lathe the spindle speeds range from 400 to 2,000 r.p.m. We hope to describe these machines more fully in due course. A 16½-in. centre lathe, which has been despatched to a Rhodesian copper mine, has a 14-in. bore spindle, and twin gaps in the bed, to enable railway wagon wheel sets to be re-turned.

WILLSON LATHES, LTD., Ovenden, in view of the quieter demand for standard 6½-, 7½-, and 8½-in. centre lathes, have now extended their range to include sizes up to 18-in. centres, with beds up to 32 ft. long. The reconditioning of all types of machine tools, up to a weight of 10 tons, is also being undertaken, and our attention was drawn to a recently-overhauled planing machine of 16- by 6- by 5-ft. capacity.

BINNS & BERRY BROS. (HALIFAX), LTD., Ovenden, in addition to their standard 6½- to 12½-in. centre lathes, some of which are destined for the U.S.A., are building a number of thread whirling machines, scalping lathes for extruded alloy

steel bars, and a 60-in. swing surfacing and boring lathe.

HALIFAX RACK & SCREWCUTTING CO., LTD., Ovensden, report a good demand for the cutting of racks and traverse screws, including thread-whirled screws. A lead screw pitch correction service is now provided at these works.

STANLEY MACHINE TOOL CO., LTD., New Bank, have orders in hand for standard lathes of 7½-, 8½-, and 10½-in. centres, also for sliding-bed lathes of 10½-, 12½- and 14½-in. centres. One of the latter has a 24-ft. long bed. Export markets represented in the order book include Australia, New Zealand, South Africa, Canada, India, and the Middle East.

JOHN MITCHELL & CO. (HALIFAX), LTD., Godley Ironworks, are steadily employed on the production of 8½-in. centre all-gear head lathes with 6-ft. and 8-ft. beds, also with longer beds, to special requirements. H. B.

Grantham

RUSTON & HORNSBY, LTD., are actively engaged in the production of horizontal oil engines, ranging from 5 to 35 h.p., vertical oil engines from 4 to 12½ h.p., pumps up to 24-in. bore, and gearboxes.

AVELING-BARFORD, LTD., have a good programme of diesel road rollers, petrol rollers, dumpers, calf-dozers, motor graders and trench cutting machines in progress, a proportion of which is destined for export. In association with GOODWIN BARSBY & CO., BARFORD (AGRICULTURAL), LTD., the company displayed some 19 machines, comprising road-making, earthmoving, building and agricultural equipment, at the Public Works Exhibition at Olympia. These exhibits included various sizes of road rollers, dumpers, graders, a mobile asphalt plant, an Acme crusher, and other products, which incorporate various improvements in design and new features. The latest addition to plant at these works is a Kearns Optometric toolroom boring machine.

R. H. NEAL & CO., LTD. (head office—Longfield Avenue, London, W.5), have home and overseas orders in hand for a wide range of mobile cranes. Recent developments include the all-hydraulic Hymax crane which carries a maximum load of 10,000 lb., with the jib horizontal, under 8 ft. headroom. Telescoping of the jib, slewing, dericking and steering are all hydraulically operated, and the crane has exceptional out-reach and rapid travelling speed. Attention may also be drawn to the recently-developed types NMS and NS70 fully mobile cranes which have full circle slewing and direct mechanical-diesel drive. H. B.

Lincoln

ROBEY & CO., LTD., have a variety of work in progress, including electric winders for the National Coal Board, also Lloyds Class 1 fusion-welded pressure vessels and fabricated steel components for various industries, and experimental steam engines for educational establishments. There is an increasing demand for Meehanite castings for applications demanding heat, wear or corrosion resistance, and some of these castings are being supplied for atomic power stations.

CLARKE'S CRANK & FORGE CO., LTD., are well placed for orders for forged and machined diesel oil engine crankshafts, in a wide range of sizes, also for air compressor, locomotive and pump crankshafts. We may note that work is in progress for the National Coal Board.

ICTA, LTD., are doing a good business in their various types of cemented-carbide-tipped tools and high-speed steel solid and butt-welded lathe and planer tools. Both special and standard form tools, for the motor car, aircraft, and other industries, are in good request. The latest addition to the plant is a British Furnaces fully-automatic, atmosphere-and-temperature-controlled, gas-fired high-speed steel heat-treatment furnace. H. B.

Industrial Design

A section of the November issue of *Design*, the journal of The Council of Industrial Design, The Design Centre, 28 Haymarket, London, S.W.1, and The Council of Industrial Design Scottish Committee, Scottish Design Centre, 46 West George Street, Glasgow, C.2, is devoted to the first of a series of articles on the importance of combining functional and aesthetic design in machine tools. As an example of how this combination can be achieved successfully a "case-history" is given of the re-design of an open-fronted, inclinable press. The machine in question is a 35-ton press built by E. W. Bliss (England), Ltd., and when the company decided to re-design, the solution of the problems of improving the external appearance was entrusted to a consultant industrial designer. This designer, who was concerned primarily with re-styling the machine, worked in collaboration with the firm's senior design engineers, who were responsible for its functional aspects.

The procedure which was adopted involved three distinct phases. Firstly, meetings were held at which the firm's designers discussed the changes which were to be made in the mechanical arrangement of the machine, with the industrial designer present with a "watching brief." For the most

part, the changes decided upon at these meetings were made as a result of troubles encountered during production and maintenance of the machine in the past. When this stage had been completed, the industrial designer severed contact with the company's engineers, and in due course prepared a number of sketches, and a wooden model, of the newly-designed press as he conceived it.

During the third, and final, stage, a series of meetings was held at which a compromise was reached between the requirements of both parties. In some instances, the consultant's design had to be modified for practical reasons peculiar to the type of machine concerned, but on the whole, it is stated, the outcome of the collaboration was extremely successful.

It is suggested in the article that the need to balance what is aesthetically desirable against what is functionally necessary, and what is commercially needed against what is economically possible, may become increasingly important with the advent of the European Free Trade Area.

Lapping Machine Demonstration

Payne Products International, Ltd., Lawrence Estate, Green Lane, Hounslow, Middlesex, are staging demonstrations, until November 21, of British-built Lapmaster flat lapping machines for which they are the distributors.

The company also undertakes the precision lapping of components on a contract basis, and Lapmaster machines in the 12-, 24-, and 36-in. sizes are available at the Hounslow works for this purpose. A 48-in. machine, which, as was mentioned in **MACHINERY**, 92/1284—30/5/58, has recently been added to the British-built Lapmaster range, will shortly be installed.

Lapmaster machines permit workpieces to be held to an accuracy of 1 light band (0.0000126 in.) for flatness and to a surface finish as smooth as 2 micro-inches. Among the wide range of precision lapped components that is being shown in connection with the demonstration may be mentioned small ceramic pieces with a thickness of only 0.0025 in. Items in steel, cast iron, aluminium and brass, including camera parts, components for motor-car engines, electric razors, and vacuum pumps, and extrusion dies for nylon threads, are also available for inspection, and afford an indication of the diversity of work that can be handled on Lapmaster machines.

It may be mentioned that a 36-in. machine with an 80-in. convex radius formed on the working surface of the lap has recently been supplied by the company for producing a concave surface on the component. In addition, development work

is in progress in connection with the lapping of convex surfaces. Reference may also be made to a set-up, which is being shown, for lapping a valve guideway in the bore of a component for a railway air brake. The guideway takes the form of a slot which extends for the full length of the bore, and the rectangular-section lap is reciprocated by means of a connecting rod, attached to an eccentric mounted on the circular lap of the Lapmaster machine. The workpiece is held in a fixture secured to a fixed plate on the bed. Contact pressure between the rectangular lap and the slideway is applied by a spring-loaded attachment which passes through the workpiece bore. While the operation on the slideway is in progress, the mating valve slide is lapped, and other rectangular laps are conditioned, in preparation for future use, by means of the circular lap of the machine.

A department has been established at the company's works for the production of optical flats from 1 to 12 in. diameter in plate glass, Pyrex and quartz. The re-conditioning of optical flats, and the precision polishing of lapped workpieces, is also undertaken in this department.

The company has recently been appointed sole agent in this country for the Swiss-made Diavite Microtester surface finish testing equipment, which is available for demonstration.

New Electrical Engineering Courses

In view of the increasing demand for highly-trained electrical engineers, the governors of Faraday House Engineering College, 66 Southampton Row, London, W.C.1, have introduced so-called "sandwich" courses for men and women in industry, as a part of a revised educational policy. A new award, which is known as Associate Faraday House, has been established, and is to be presented on satisfactory completion of studies in one of the following subjects: power engineering; light engineering; telecommunications; and electronics.

Under the new policy, a student is selected by an industrial concern from its employees, and spends six months in the works and six months in the College over a total period which may range from four to five years, depending on the level of education at entry. On conclusion of a period of basic training, the employer, the college principal, and the student decide among themselves whether the student is better fitted to take the Associate course for the remainder of the training period, or to study for the Diploma Faraday House award which leads to professional status. For successful completion of the academic part of the Diploma syllabus only, an intermediate award entitled

Graduate Faraday House has now been introduced.

It is pointed out that the Associate award is not intended to denote specialists but rather electrical engineers who have received a general education with particular concentration on the subjects in which they seek careers.

Association of Engineering Distributors

At the 15th annual general meeting of the Association of Engineering Distributors, Ltd., Hastings House, Norfolk Street, London, W.C.2, Mr. Ralph Hall, managing director of John Hall Tools (Group), Ltd., was elected president, and Mr. A. N. Creed, of Power Tools (Specialities), Ltd., and Mr. K. C. Allen, of A. H. Allen & Co. (Engineers), Ltd., vice presidents. Mr. R. A. Harding, Macrome, Ltd., was elected to membership of the Council. After the meeting, Mr. R. F. Collischoon, national vice-chairman and fellow of the Sales Managers' Association, Inc., and managing director of Colbeam Palmer, Ltd., spoke on "The Art of Selling."

The meeting was followed by the annual luncheon at which Mr. J. Hugh Neill, Master Cutler of Sheffield, proposed the toast of "The Association of Engineering Distributors," and Mr. Ralph Hall responded. The toast of "The Guests" was then proposed by Mr. K. C. Allen, and Mr. R. S. Bruce, vice-president of the Sheffield Chamber of Commerce, replied.

Mikron Golden Jubilee

The Swiss firm of Mikron S.A., Bienne, who are well known for their range of high-precision gear and thread cutting machines, are this year celebrating their golden jubilee. Founded in 1908 in a small workshop in Bienne, the company initially had a staff of four and 14 workmen. In the beginning, attention was concentrated on designing and building a comprehensive range of small precision lathes and milling machines for the Swiss watch industry, but the founders were soon convinced of the advantages which were to be gained from the hobbing process for the production of small gears. Accordingly, in 1912, they introduced their first gear hobbing machine, known as the type No. 79, and, at the same time, started the manufacture of hobs. The latter, it may be noted, were produced, from the early days, with pitches as fine as 150 D.P. Over the years the range of machines was steadily widened, and in 1925 the type 104 thread milling machine was introduced. One of the latest developments, which was shown at the recent Milan machine tool exhibition, is a hopper feed for the No. 119 pinion hobbing machine which provides for fully automatic operation.

The company is still situated in Bienne, where it has a modern well-equipped factory which, within the last two years, has been considerably enlarged. Today, the policy remains unchanged in that machines are built only for small high-precision work, as was the intention when the firm was founded 50 years ago.

Mikron S.A. are represented in this country by Henry Turner (Machine Tools), Ltd., 58 Upper Tooting Road, London, S.W.17.

British Machinery Merchants

At a conference held recently in London it was decided to form the Association of British Machinery Merchants. Mr. Harold Vernon, of Thos. W. Ward, Ltd., Sheffield, who took the chair at the meeting at the invitation of the convener, Mr. C. W. Allen, was elected president. Other officers are as follows: deputy president, Mr. H. E. Reed (Reed Brothers [Engineering], Ltd.); treasurer, Mr. H. D. Leete (Hodson & Co. [Machinery], Ltd.); and secretary, Mr. C. W. Allen. Proposed terms of reference which had been drawn up were unanimously adopted by the meeting.

The new Association is intended to meet the needs of those merchanting firms not at present catered for by existing specialist organizations, and full particulars can be obtained from Mr. C. W. Allen, 100 Park Street, Grosvenor Square, London, W.1.

The Packaging Centre

The Packaging Centre, 50 Poland Street, London, W.1, which was opened earlier this year by Sir David Eccles, President of the Board of Trade, provides a permanent display of materials and equipment for the protective packaging of a wide variety of consumer goods and industrial machinery, and at present more than a hundred firms are represented. A comprehensive information service is available relating to exhibits, and advice is given on packaging problems.

The Price of a Subscription to MACHINERY is 52 Shillings per annum, post free, to any part of the world.

Subscribers are not bound for any definite period of subscription. We send MACHINERY, post free, each week until told to stop. Subscribers can pay yearly, half-yearly, or quarterly, pro rata. (Cash with order)

To MACHINERY, National House, 21 West Street, Brighton 1.

Please send me/us MACHINERY every week until I/we tell you to stop, for which I/we enclose remittance of 52 Shillings per annum or pro rata

Name

Address

* Position

* Firm

• For our mailing records only.

19/11/58

Industrial Notes

WEBLEY & SCOTT, LTD., have now occupied new works at Park Lane, Handsworth, Birmingham, 21 (telephone number, West Bromwich 2821).

THE EXPANDED METAL CO., LTD., Burwood House, Caxton Street, Westminster, London, S.W.1, have acquired the whole of the ordinary and preference share capital of The Glasgow Expanded Metal Co., Ltd.

PHILIP DE HAVILLAND MACHINE CO., LTD. Following a reorganisation, the administration of this company is now being carried on from the following address: Industrial Estate, Cheney Manor, Swindon, Wilts. (telephone number, Swindon 6336-7).

ALFRED BULLOWS & SONS, LTD., Long Street, Walsall, Staffs., have introduced a lightweight air hose for use with their "baby" L 900 spray gun. This rubber hose, covered with rayon braid, has a $\frac{3}{8}$ -in. bore. It is light and flexible, and ensures ease of handling.

ANGLO-SWISS SCREW CO., LTD., Trout Road, West Drayton, Middlesex.—On the occasion of a recent dinner and dance, gold watches were presented to four employees, each of whom had just completed 25 years' service. The number of these long service employees is now 35.

CLARE COLLETS, LTD., Broadheath, Altrincham, Cheshire, have appointed Stewart & Houston, 5 York Street, Glasgow, C.2, as sole agents for Clare milling equipment in Scotland. Stocks of all standard items will be carried and a technical service for milling problems will be provided.

FRED FERRARIS (CLERKENWELL), LTD., 18a Northampton Square, Ashby Street, Clerkenwell, London, E.C.1, have established a new division for miniaturization of instruments. This division will give advice, carry out research, develop prototypes, or undertake production in this field.

AN AUCTION SALE OF MACHINE TOOLS and miscellaneous stores from M.O.S. Storage Depot, Byley, Middlewich, Cheshire, will be held on December 2 at New Islington Public Hall, Ancoats, Manchester. The auctioneers will be J. H. Norris & Son (Dept. N), 9 Albert Square, Manchester, 2.

VERNON INSTRUMENT CO., LTD., inform us that they have recently taken possession of new works premises and that their address, also that of their associate companies, George Vernon Sales, Ltd., and George Vernon, Ltd., is Wilbury Way, Hitchin, Herts. (telephone number, Hitchin 2322/4).

KLOCKNER MOELLER (ENGLAND), LTD., 7 Charterhouse Buildings, Goswell Road, London, E.C.1. The authorized capital of this company has been increased from £3,000 to £16,000, as from September 23. Of the extra £13,000, £10,500 has been issued and the remainder will be issued shortly.

THE BRITISH ASSOCIATION OF MACHINE TOOL MERCHANTS, Effingham House, Arundel Street, Strand, London, W.C.2.—The 18th annual general meeting will be held at The

May Fair Hotel, London, on November 25, and will be followed by a luncheon at which Mr. W. J. Taylor, C.B.E., D.L., J.P., M.P., Parliamentary Secretary, Ministry of Supply, will deliver an address.

THE BRITISH PRODUCTIVITY COUNCIL, 21 Tothill Street, London, S.W.1, has been appointed to represent the United Kingdom on the management of the European Organization for Quality Control, a body which has been set up by the European Productivity Agency to stimulate an international appreciation of quality standards and quality control procedure.

BALDWIN INSTRUMENT CO., LTD., Brooklands Works, Dartford, Kent, have established a team of application and design experts to give advice on the use of their wide range of equipment. With the assistance of the Baldwin Electronic Division, the team will make recommendations for complete installations for pneumatic, hydraulic, or electrical control.

ROLAND GOODALL, LTD., 19 Station Road, Burton-on-Trent, have been appointed sole agents in the United Kingdom for the Nibro-Max range of steplessly variable speed (1,000 to 40,000 r.p.m.) flexible shaft machines and accessories, for such operations as sanding, grinding, nibbling, and shearing, made by Niederberger & Co., Lucerne, Switzerland.

MARSTON EXCELSIOR, LTD., Wolverhampton, a subsidiary of Imperial Chemical Industries, Ltd., have introduced flexible containers known as Portolite tanks for the transport and storage of a wide range of bulk liquids. Made from coated, strong woven fabrics, the tanks are light, and for return journeys they can be rolled up and occupy little space.

H. WILLIAMS & SON, LTD., Lark Works, Sandridge Road, St. Albans, have appointed W. O. Bullock & Sons, Ltd., 126 Rodbourne Road, Swindon, Wilts., as selling agents for all items which they manufacture or market, including Swiss Compac and Parvus dial gauges, and Swedish Oberg burrs, in the counties of Wiltshire, Hampshire, Dorset, Devon, Cornwall, Somerset, Gloucester, Monmouth, Glamorgan, Carmarthen, and Pembroke.

THE SHEFFIELD TWIST DRILL & STEEL CO., LTD., Summerfield Street, Sheffield, 11, have drawn our attention to the technical advisory service which they offer throughout the country. In this connection recommendations are made concerning the correct use of twist drills, reamers, end mills, milling cutters, and machine vices, and investigations are carried out in instances where it is believed that the performances of tools could be improved, or alternative types recommended for particular operations. To provide such a service in London and the south of England, Mr. Roger Knowles, who has spent some years in the Sheffield works, has been appointed technical representative for the area, and he will also be concerned with the introduction of the latest Dormer products.

Personal

MR. DAVID E. BURTON, B.Sc.(Eng.), is now in charge of the London technical sales department, at Ibex House, Minorities, E.C.3, of Rocol, Ltd., Swillington, near Leeds.

MR. A. C. BURN, of Sales Audits, Ltd., has been elected to the board of North West Machine Design Co., Ltd., 177 Kenton Road, Kenton, Harrow, Middlesex.

MR. G. RONALD GREEN has been appointed general sales manager of Tangyes, Ltd., Cornwall Works, Smethwick, Birmingham.

MR. G. P. DARNLEY and MR. R. C. WEBSTER have been appointed joint managing directors of Bratby & Hinchliffe, Ltd., Gorton Lane, Manchester, 18.

MR. J. T. TROMAN has been appointed a director of the machine tool division of B. O. Morris, Ltd., at Portsmouth, and MR. O. G. EVES has been appointed works director for the company at Coventry.

SIR DONALD BAILEY, O.B.E., J.P., Director of the Ministry of Supply's Military Engineering Experimental Establishment at Christchurch, Hants, and inventor of the Bailey bridge, has been co-opted to the Council of the British Welding Research Association, 29 Park Crescent, London, W.1.

MR. ARTHUR GRIFFITHS, O.B.E., M.I.Prod.E., has been appointed group managing director of Sterling Industries, Ltd., Chard, Somerset. Until 1956 he was a director and general manager of the Daimler Co., Ltd., Coventry, and had previously held the position of general manager for F. Perkins, Ltd., Peterborough.

MR. E. J. PLAYER and MR. W. W. JEACOCK, M.I.Prod.E., have been appointed divisional directors (a newly established post) of Coventry Gauge & Tool Co., Ltd., Coventry. MR. H. ROCKWELL, B.Sc. (Eng.), A.M.I.Mech.E., MR. P. F. ROCKWELL, B.Sc. (Econ.), A.C.A., MR. H. A. CHAMBERS, M.I.Prod.E., and MR. J. M. BRICE, M.I.Prod.E., hold similar positions (divisional director) with Rockwell Machine Tool Co., Ltd., Welsh Harp, Edgware Road, N.W.2.

MR. E. D. DAWSON has been appointed a director of the Selson Machine Tool Co., Ltd., Minerva Road, London, N.W.10, a member company of the George Cohen 600 Group. He joined the firm after leaving school in 1936. During the war he served in R.N. landing craft and mine-sweepers and after he was demobilized he returned to Selson. From 1947 to 1950 Mr. Dawson was outside representative for London and the Eastern Home Counties. He was appointed sales manager in 1954, and as a member of the board will continue to be responsible for sales.



Mr. E. D. Dawson

Coming Events

MANCHESTER ASSOCIATION OF ENGINEERS. November 28, at 6.45 p.m., at the College of Science and Technology, Sackville Street, Manchester; lecture on "Electro-mechanical Themes in Machine Tool Design," by the Earl of Halsbury.

INSTITUTION OF ELECTRICAL ENGINEERS. *Western Centre*. November 27, at 6.45 p.m., at the Colston Hall, Bristol; and *West Wales (Swansea) Sub-centre*. November 25, at 6 p.m., at the Brangwyn Hall, Swansea. Faraday lecture on "Automation," by H. A. Thomas.

INSTITUTION OF MECHANICAL ENGINEERS. November 26, at 5.30 p.m., at the Institute of Marine Engineers' Memorial Building, 76 Mark Lane, London, E.C.3; Sir John Parsons Memorial Lecture on "Recent Advances in Nuclear Engineering," by Sir John D. Cockcroft, O.M., K.C.B., C.B.E. *North Western Branch, Industrial Administration and Engineering Production Group*. November 27, at 6.45 p.m., at the Engineers' Club, Alber Square, Manchester, 2; lecture on "Application of Optics in Engineering Inspection," by O. C. Taylerson.

INCORPORATED PLANT ENGINEERS. *Merseyside and North Wales Branch*. November 27, at 7.15 p.m., at the Exchange Hotel, Liverpool; paper on "Some Aspects of Automatic Control," by R. E. Harvison, B.Sc.

INSTITUTION OF PRODUCTION ENGINEERS. *Shrewsbury Section*. November 25, at 7.30 p.m., at the Walker Technical College, Oakegates, Shrewsbury; lecture on "Ceramic Cutting Tools," by G. R. Conner. *Worcester Section*. November 26, at 7.30 p.m., at the Victoria College, Worcester; lecture on "Spark Machining," by E. A. Sweetman. *Loughborough College Student Section*. November 25, at 7.30 p.m., in Room A.1, Loughborough College, Schofield Building, Ashby Road, Loughborough; lecture on "A Modern Foundry for the Manufacture of Small Steel Castings by New Moulding Techniques," by J. H. Osborn. *Lincoln Section*. November 27, at 7.30 p.m., at the Ruston Club, Lincoln; lecture on "Some Factors Affecting Cutting Tool Performance," by R. J. Cowie. *Manchester Section*. November 24, at 7.15 p.m., at the Manchester College of Science and Technology, Sackville Street, Manchester; lecture on "Diploma in Technology," by Dr. Whitworth, Ph.D., M.Sc. *Stoke-on-Trent Section*. November 24, at 7.30 p.m., at the Grand Hotel, Hanley, Stoke-on-Trent; lecture on "The Use of Rubber in Engineering," by Dr. A. N. Grant, Ph.D., B.Sc. *Rochester Graduate Section*. November 27, at 7.30 p.m., at the Sun Hotel, Chatham High Street, Rochester, Kent; lecture on "Lens Manufacture," by E. Atkinson. *Cardiff Section*. November 28, at 7 p.m., at the South Wales Institute of Engineers, Park Place, Cardiff; lecture on "Tooling with Epoxy Resins," by E. M. White.

Correction

The Highwood Engineering Co., Ltd., 71-75 Allcock Street, Birmingham, 9, inform us that they designed and supplied the guard shown fitted to an E.M.B. No. 12 die casting machine in Fig. 5 of the article devoted to "Safety Arrangements for Pressure Die Casting Machines," in MACHINERY, 93/1003-29/10/58. In the caption to this illustration, and the accompanying text, the guard was inadvertently attributed to another maker.

Training for Electrical Engineers

The Council of the Institution of Electrical Engineers, Savoy Place, London, W.C.2, have for some time been concerned that the plans to expand the industrial training of professional engineers have not kept pace with the Government's programme of expansion for the universities and technical colleges for the purpose of increasing the number of technologists.

If there is to be a substantial increase in the number of engineers who receive adequate industrial training in

electrical engineering, means must be found to provide such training facilities in the smaller and particularly in the more specialized firms in the electrical engineering industry, and in those concerned in the utilization of electrical power. Many of these concerns cannot provide the breadth of training which is necessary within their own organizations, and, in the hope that it may be possible to arrange for co-operative effort in the provision of such training, the Council have decided to stage a conference on November 21, at which this matter may be fully discussed.

Machine Tool Share Market

Stock markets were very active during the period under review, and although the general tendency was irregular, the underlying tone remained firm. Interest was centred mainly in the commercial and industrial sections where good class ordinary shares were in demand at improving levels. Some irregularity in price movements was shown, but changes were mostly favourable, on balance, and many bright features were in evidence.

The gilt-edged section, however, was depressed, and for the most part quotations for British Funds and kindred stocks moved downwards owing to persistent small selling and lack of support. Towards the finish, however, prices were inclined to rally.

Among machine tool issues, Armstrong Stevens advanced 10½d. to 9s. 1½d.; Asquith Machine Tool, 3d. to 24s. 6d.; Clarkson Engineers, 3d. to 15s. 3d.; Kitchen & Wade, 3d. to 8s. 3d.; F. Pratt, 3d. to 22s. 9d.; British Oxygen, 1s. 6d. to 45s. 6d.; Brooke Tool, 1½d. to 4s.; Chas. Churchill, 4½d. to 6s. 9d.; John Harper, 4½d. to 16s. 6d.; John Holroyd "A," 6d. to 13s. 6d.; John Holroyd "B," 6d. to 13s. 3d.; Ambrose Shardlow, 2s. to 45s. 6d.; and John Shaw & Sons (Wolverhampton), 9d. to 14s. 6d. On the other hand, Broom & Wade lost 3d. at 11s. 6d.; Craven Bros. (Manchester), 1½d. at 8s. 4½d.; Modern Engineering, 6d. at 8s. 6d.; and Thos. W. Ward, 7s. 3d. at 79s. 9d.

COMPANY		Denom.	Middle Price	COMPANY		Denom.	Middle Price
Abwood Machine Tools, Ltd.	Ord.	1/-	9d.	Harper (John) & Co., Ltd.	Ord.	5/-	16 1/2
Armstrongs, Stevens & Son, Ltd.	Ord.	5/-	9 1/4	" "	4½% Red.	£1	12 1/10
Allen (Edgar) & Co., Ltd.	Ord.	£1	38/-	" "	Cum. Prf.		
" "	5% Prf.	£1	15 3/4	Herbert (Alfred), Ltd.	Ord.	£1	37 1/2
Arnott & Harrison, Ltd.	Ord.	4/-	15 1/2	Holroyd (John) & Co. Ltd.	"A" Ord.	5/-	13 1/2
Asquith Machine Tool Corp., Ltd.	Ord.	5/-	24 1/2	"B" Ord.	Ord.	5/-	13 1/2
" "	6% Cum. Prf.	£1	18 1/2	Jones (A. A.) & Shipman, Ltd.	Ord.	5/-	22 1/2
Birmingham Small Arms Co., Ltd.	Ord.	£1	35/-xd	" "	7% Cum. Prf.	5/-	5/-
" "	5% Cum.	£1	15/-	Kayser, Ellison & Co., Ltd.	Ord.	£1	46 1/2
" "	A" Prf.	£1	18/-	" "	6% Cum. Prf.	£1	18 1/2
" "	B" Prf.	£1	18/-	Kendall & Gent, Ltd.	Ord.	5/-	7/-
" "	4% 1st Mort.	Stk.	88½	Kerry's (Gt. Britain), Ltd.	Ord.	5/-	6 1/10
British Oxygen Co., Ltd.	Ord.	£1	45 1/2	Kitchen & Wade, Ltd.	Ord.	4/-	8 3/4xd
" "	6½% Cum. Prf.	£1	22/-	Martin Bros. (Machinery), Ltd.	Ord.	2/-	1 1/2
Brooke Tool Manufacturing Co., Ltd.	Ord.	5/-	4/-	Massey, B. & S., Ltd.	Ord.	5/-	9 1/2
Broom & Wade, Ltd.	Ord.	5/-	11 1/2	Modern Engineering Machine Tools Ltd.	Ord.	5/-	9 1/2
" "	6% Cum. Prf.	£1	17 1/2	Newall Engineering Co., Ltd.	Ord.	2/-	4 1/2
Brown (David) Corporation Ltd.	5½% Cum. Prf.	£1	15 1/4xd	Newman Industries, Ltd.	Ord.	2/-	2 1/2
Buck & Hickman, Ltd.	6% Cum. Prf.	£1	17 1/2	" "	6% Prf. Ord.	5/-	5 1/2
Butler Machine Tools Co., Ltd.	Ord.	5/-	8/-	Noble & Lund, Ltd.	Ord.	2/-	3 1/2
" "	5% Cum. Prf.	£1	13 1/2	Osborn (Samuel) & Co., Ltd.	Ord.	5/-	20 1/2
C.V.A. Jigs, Moulds & Tools, Ltd.	5½% Red.	£1	11 1/2	" "	5½% Cum. Prf.	£1	26 1/2
" "	Cum. Prf.			Pratt (F.) & Co., Ltd.	Ord.	5/-	22 1/2
Churchill (Charles) & Co., Ltd.	Ord.	2/-	6 1/2	Scottish Machine Tool Corporation, Ltd.	Ord.	4/-	5 1/2
" "	6% Cum. Prf.	£1	26 1/4	Shardlow (Ambrose) & Co., Ltd.	Ord.	£1	45 1/2
Churchill Machine Tool Co., Ltd.	Ord.	5/-	18 1/2	" "	Ord.	5/-	14 1/2
" "	6% Cum. Prf.	£1	18 1/2	Shaw (John) & Sons, Wolverhampton, Ltd.	Ord.	4/-	13 1/2
Clarkson (Engs.), Ltd.	Ord.	5/-	15 1/2	" "	5% Cum. Prf.	£1	15 1/2
Cohen (George), Son & Co., Ltd.	Ord.	5/-	10 1/2	Sheffield Twist Drill & Steel Co., Ltd.	Ord.	£1	15 1/2
" "	4½% Cum. Prf.	£1	14 1/2	" "	Ord.	5/-	7 1/2
Coventry Gauge & Tool Co., Ltd.	Ord.	10/-	17 1/2	Stedall & Co., Ltd.	"B" non-voting Ord.	10/-	22 1/2
" "	5% Cum. Prf.	£1	16 1/2	" "	Ord.	5/-	8 1/2
Coventry Machine Tool Works, Ltd.	Red. Prf.	4/-	8 1/2	Sykes (W. E.), Ltd.	4½% Deb.	82/-	
Craven Bros. (Manchester), Ltd.	Ord.	5/-	8 1/4	Tap & Die Corporation, Ltd.	1961-1977		
Elliott (B.) & Co., Ltd.	Ord.	1/-	3/-	" "	Ord.	10/-	18 1/2
" "	4½% Red.	£1	13 1/2	Wadkin, Ltd.	Ord.	£1	79 1/2
" "	Cum. Prf.			Ward (Thos. W.), Ltd.	5% Cum.	£1	16 1/2
Expert Tool & Case Hardening Co., Ltd.	Ord.	2/-	1 1/2	" "	1st Prf.	£1	24 1/2
Firth Brown Tools, Ltd.	4% Cum. Prf.	£1	12 1/2	" "	5% Cum.	£1	24 1/2
Greenwood & Batley, Ltd.	Ord.	£1	52 1/2	Willson Lathes, Ltd.	2nd Prf.	1/-	2 1/4

The Middle Prices given in the list are in several cases nominal prices only and not actual dealing prices. Every effort is made to ensure accuracy, but no liability can be accepted for any error.

* Sheffield price.

† Birmingham price.

**MG12**

GRINDING CAPACITY 3in. diameter \times 12in. long
 SWING 5in. diameter
 WHEEL SIZE 10in. \times 1in. \times 3in. bore
 WHEEL SPINDLE SPEEDS 2,100 and 2,500 r.p.m.
 WORK SPEEDS (12) ranging from 75 to 780

This
MYFORD
 MACHINE TOOLS

**CYLINDRICAL
 GRINDER**
is worth looking into!

Here is a grinder which is capable of repetitive accuracy to within 0.0001in., will produce surface finishes down to 3 micro-inches, and has the following advantages offered by no other machine at such a low cost: precise wheelfeed mechanism with hardened threadground feedscrew. Readily interchangeable cartridge type nitralloy wheelspindle unit with automatic oil circulation. 'Dead' or 'Live' Workhead with electrical speed variation and plug-in facility for Extra Equipment Swivelling Workhead. Internal Grinding Attachment.

Equipment available for: Centre Pointing, Angular and Radius Wheel Dressing. Also Chucks, Collets, Faceplate.

Myford ENGINEERING Co. Ltd.
 BEESTON · NOTTINGHAM · TEL. 25-4222



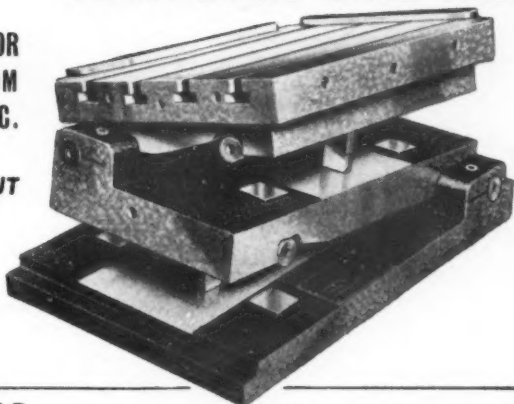
"Composine" COMPOUND SINE TABLE

...FOR THE GRINDING OF SINGLE OR
 COMPOUND ANGLES, TOOL ROOM
 INSPECTION, JIG BORING ETC.

A PRECISION JOB THROUGHOUT
 WITH 5" AND 10" ROLLER CENTRES
 SIZE: Table 11½" \times 8"
 Height when flat 5½"

N.P.L. Certificate to 0.2 minutes.
 supplied, if required, at extra cost.

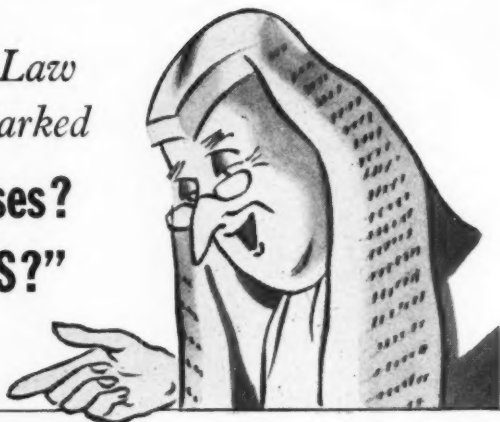
MANUFACTURED BY


WINDLEY BROS. LTD.
CROWN WORKS, CHELMSFORD.

Telephone CHELMSFORD 2224

When answering advertisements kindly mention MACHINERY.

*In a recent case of Uncivil Law
Mr. Justice Bloop remarked*
**"Little Horses? Little Horses?
WHAT ARE LITTLE HORSES?"**



Whereupon the defendant, turning a bright purple and brushing aside a number of gold plated, diamond studded Counsel, whom he had retained and refreshed at fabulous fees, leapt to his feet and cried: "My Little Horses are the driving force of the motors that power the World's Finest Power Tools, Electric and Pneumatic. Some of them $\frac{1}{2}$ h.p., some $\frac{1}{4}$ h.p., and some more or less and notwithstanding. *Big Motors—Big Horsepower; Little Motors—LITTLE HORSEPOWER—DESOUTTER HORSEPOWER.* All the world knows and loves my Little Horses . . ."

*At this point loud
N-e-i-g-h-i-n-g was heard
from the public gallery,
and His Lordship ordered
the court to be cleared.*

FASTEST—Type 03, High Speed Pneumatic Grinder—70,000 rpm.

SLOWEST—Type R39, Rotor Pneumatic Drill of 165 rpm. For drilling Titanium.

BIGGEST—Type H2, Electric Drill, $\frac{1}{2}$ " chuck.

TINIEST—Type M60, Reversing Miniature Pneumatic Screwdriver weighing 8 ozs.

RUMMIEST—Type M4, Special Purpose Full Return Head Pneumatic Drill. Drills holes backwards.

MOSTEST—25-motor Multiple Nutrunner for engine head assembly. Tightens 25 nuts at once.

INGENIOUSEST—Electric Oscillating Saw, 18,000 strokes pm. Cuts surgical plaster but not the skin.

DESOUTTER Little Horse POWER TOOLS

DESOUTTER BROS. LIMITED • The Hyde, Hendon, NW9 • Telephone: COLindale 6346 (5 lines)

CRC310

When answering advertisements kindly mention MACHINERY.



For purity in diecasting

POLAK DIECASTING MACHINE

POLAK pressure diecasting machines are being extensively used at present for a variety of casting work throughout the world. On the left are typical castings produced with the machine.

POLAK diecasting machines cast aluminium, zinc, copper, magnesium and alloys of other non-ferrous metals.

Aluminium alloys can be cast up to a weight of 1.32 lbs. (1.76 lbs. in special cases), zinc alloys up to 3.35 lbs. and copper alloys up to 2.76 lbs.

Control is fully hydraulic and the semi-automatic nature of the machine enables it to be operated by semi-skilled labour.

BRIEF SPECIFICATION

Average output per hour, according to casting, 80 shots to 180 shots.

Pressure of operating liquid atm., 120/1,700 p.s.i.

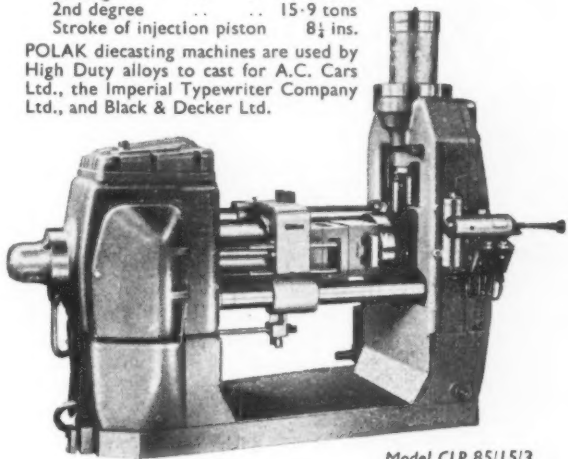
Closing:—

Maximum dieclosing force	85 tons
Stroke of closing piston	12½ ins.
Maximum opening of machine	29½ ins.
Minimum opening of machine	17½ ins.

Pressure applied to metal:—

1st degree	11.2 tons
2nd degree	15.9 tons
Stroke of injection piston	8½ ins.

POLAK diecasting machines are used by High Duty alloys to cast for A.C. Cars Ltd., the Imperial Typewriter Company Ltd., and Black & Decker Ltd.



Model CLP 85/15/3
in stock now.

Sole Selling Agents U.K.



NEWMAN INDUSTRIES LIMITED

Machine Tool Division

YATE • BRISTOL • ENGLAND

Telephone: CHIPPING SODBURY 3311

Telegrams: "DYNAMO YATE"

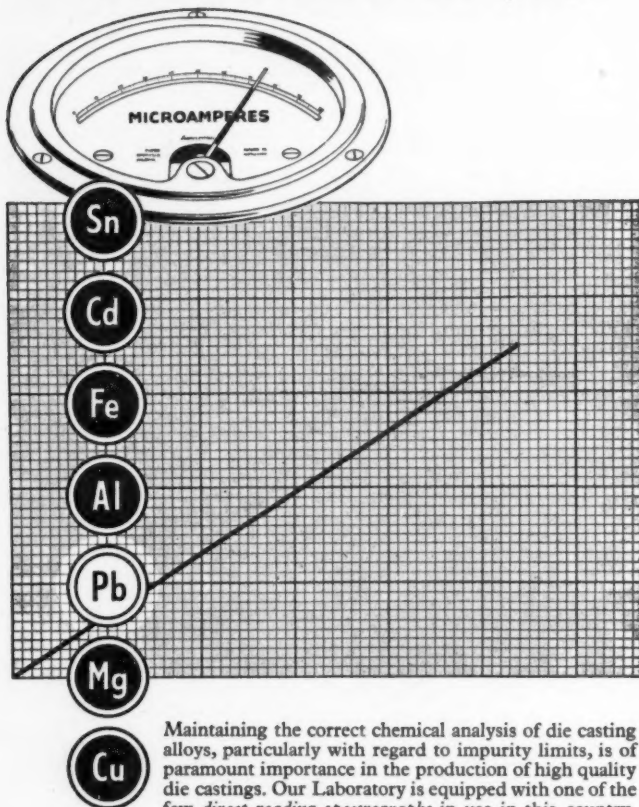
Branches at: London (Sloane 8206)

Birmingham (Northern 9634)

Manchester (Deansgate 2837/8)

Glasgow (Central 2101/2)

QUALITY CONTROL of pressure die castings



Maintaining the correct chemical analysis of die casting alloys, particularly with regard to impurity limits, is of paramount importance in the production of high quality die castings. Our Laboratory is equipped with one of the few *direct reading spectrographs* in use in this country.

As a result the requirements of the B.S.I. Certification Scheme for zinc alloy die castings are far exceeded. Every melt is analysed and the holding furnace of every machine is checked for impurities at least once per shift, enabling any variance from specification to be quickly identified.

With the utmost confidence, we can therefore claim to supply castings of the highest quality. *Quotations, without obligation, from drawings, specifications or samples.*



BS 1004

**PRESSURE DIE CASTINGS in
ZINC, ALUMINIUM AND SOFT ALLOYS**
SPARKLETS LIMITED
DIE CASTING DIVISION
TOTTENHAM, LONDON, N.17

*now
on the press*

MACHINERY'S ANNUAL Buyers' Guide 1959 EDITION

*the
standard
reference
book
for
buyers
of all
plant
equipment
and
materials
for
engineering
shops*

1000 pages giving the names, products and trade names of over 4000 firms

**order your
copy now**

Available JANUARY 1959

**TO MACHINERY (Book Department)
National House, West St. Brighton 1**

Please send a copy of MACHINERY'S
ANNUAL BUYERS GUIDE (30th edition)
on publication. Price 12.6 post free

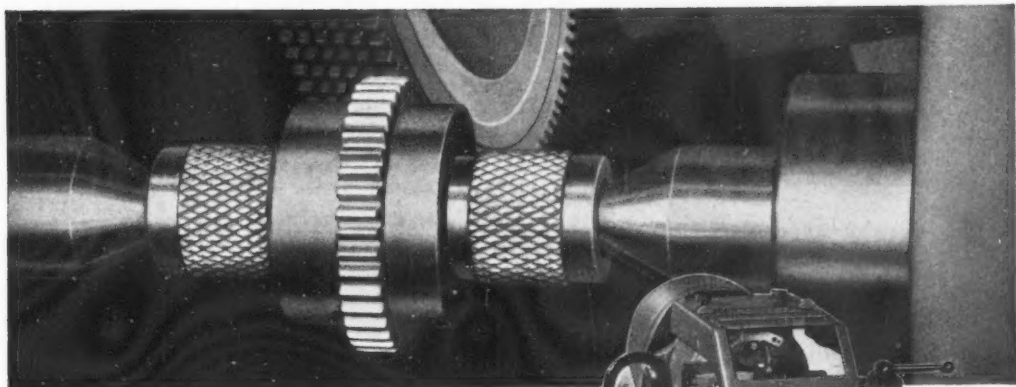
NAME _____

SIGNATURE _____

ADDRESS _____

_____ DATE _____

When answering advertisements kindly mention MACHINERY.



YOURS CONSISTENTLY...

The Sykes VS4A is a machine designed first and foremost for the fast shaving of fine pitch gears to a *consistently* high degree of accuracy; especially for the precision finishing of fine pitch gears for electronic instruments, control mechanisms and similar precision apparatus.

The VS4A can shave spur and helical gears up to 4 inches in diameter and 1 inch face width, with a pitch as coarse as 16 D.P.

As with all Sykes machinery, the VS4A is built to the highest standards of accuracy and rigidity. It occupies the minimum of floor space, and its simple loading enables it to be operated quite easily by unskilled labour. If required, automatic loading can also be employed.

The VS4A, once loaded, will rapidly and automatically perform a full cycle of operation varying from 13 to 45 seconds—depending on the material and characteristics of the component.

If you want perfection . . .

highest accuracy, best surface finish and quietest operation is achieved by gears which have been shaved. If the fine pitch gears you produce have a total composite error of more than 0.0003 inches, you should find out more about the VS4A.



**PRECISION
GEAR SHAVERS**

W. E. SYKES LTD • STAINES • MIDDLESEX • ENGLAND

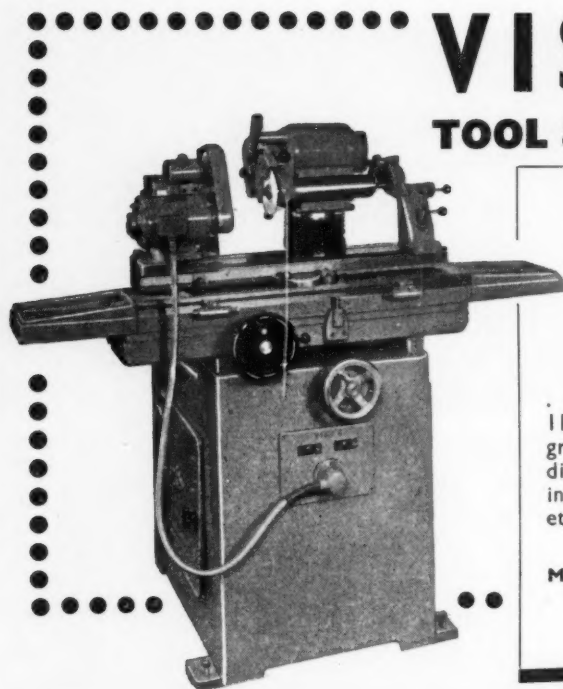
and associated companies

Sykes Tool Corpn. Ltd., Georgetown, Ontario, Canada

Sykes Machine & Gear Corpn., Newark, N.J., U.S.A.

W. E. Sykes Ltd., Mascot, Sydney, N.S.W., Australia

When answering advertisements kindly mention MACHINERY.



VISION

UNIVERSAL
TOOL & CUTTER GRINDER

ILLUSTRATION SHOWS THE STANDARD
MODEL **CAPACITY 11" X 18"**
COMPLETE WITH FULLY MOTORISED
WORKHEAD

PRICE **£495**

... also available with capacity of
11" X 24" wet grinding equipment, internal
grinding attachment, collet attachment,
dividing head, chucks, long surface grind-
ing quill, dead centre grinding attachment,
etc.

MADE BY **D. VINELL & SON LTD.**
TONBRIDGE, KENT, ENGLAND
Telephone : Tonbridge 2476

**ZINC BASE PRESSURE
IN B.S. 1004 ALLOYS
ALSO ASSEMBLIES**

DIE CASTINGS



We have specialised on Zinc Base Alloy Diecastings for forty years and whether you make motor cars or mincing machines, toys or type-writers, there is some part we can play in making life easier for you—our experience on design and production cannot fail to be of value to you.

DIE CAST PRODUCTS (LONDON) LTD.
BRITANNIA WORKS · GOURLEY PLACE · TOTTENHAM · LONDON · N.15
TELEPHONE · STAMFORD HILL 2752

When answering advertisements kindly mention **MACHINERY**.

Electrical Aids in Industry

Induction Heating - 2

The broad principles involved in the use of induction heating for melting and processing metals have already been dealt with in this series (Data Sheet No. 2). In order to make a critical examination of its possibilities, however, the potential user should be aware of certain technical factors which must influence his decisions.

Induction heating, of course, demands the use of alternating current which is available from the public supply at a frequency of 50 cycles per second. Higher frequencies, however, are desirable for certain applications and can be obtained by means of the appropriate conversion equipment. Frequencies can therefore be considered in three categories:

Mains Frequency

(direct from mains)—50 c.p.s.

Medium Frequency
(machine generator)—50-10,000 c.p.s.

High Frequency
(electronic generator)—up to about 2,000,000 c.p.s.

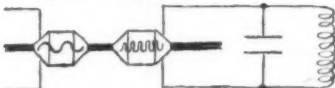
Mains Frequency

This needs no conversion equipment; it is particularly suitable for melting large pieces of scrap, and owing to the vigorous stirring forces produced, is excellent for alloy making. It has the merit of low initial cost compared with the high frequency method of melting, but is not so suitable for the production of high-grade steel.

A typical example of the use of mains frequency is the coreless induction melting furnace which can be connected direct to the public 3-phase supply. Such a furnace rated at 120 kW, with a holding capacity of 2,240 lb., will give a throughput of 5,000 lb. per hour of hot cupola metal superheated from 1,350°C to 1,450°C.

Medium Frequency

Motor generators ranging from 10 kW to 1,500 kW or more at frequencies up to about 10,000 c.p.s. are widely used for heating for forging, melting from 100 lb. to 10 tons, hardening, annealing, etc. A bank of capacitors maintains a high power factor during the heating cycle.



Another form of generator for frequencies of 1 to 2 kc.p.s. and powers around 250 kW, useful for forge heating and melting high temperature aircraft alloys, is a 6-anode steel tank mercury arc inverter.

High Frequency

Metal hardening and metallurgical processing are best handled by high frequency induction (up to about 2,000,000 c.p.s.),

Data Sheet No. 3

particularly when a very thin case is required or when the section of the workpiece is too small to heat satisfactorily at medium frequency. These high frequencies are produced either by an electronic h.f. generator or a mercury-gap h.f. generator.

The choice of frequency depends upon the metallurgical requirements and the size of the component to be treated. The following table gives the practical relationship between size and frequency, and may be used as a guide to the choice of generator, subject to metallurgical considerations.

FREQUENCY C.P.S.	Optimum Values			
	3,000	10,000	500,000	2,000,000
MIN. DEPTH OF HARDNESS POSSIBLE	.060"	.040"	.020"	.010"
Practical Values				
MIN. DEPTH HARDNESS EXPECTED	.150- .200"	.100- .150"	.030- .050"	.015- .030"
MIN. DIA. SURFACE HARDENING THIN CASE	2" & over	1" to 3"	1/2" to 2"	1/4" to 1/2"
MIN. DIA. SURFACE HARDENING DEEP CASE	2" & over	2" & over	1" & over	not suitable
MIN. DIA. THROUGH HARDENING	1" & over	1/2" to 2"	1/4" to 1/2"	not suitable

These are of course very approximate since they also depend on metallurgical considerations.

Power required for**H.F. Induction Hardening**

The high frequency power required per sq. in. of hardened surface depends upon the amount of metal behind the surface. Higher powers and shorter heating cycles are necessary for thin cases and when the thickness of metal behind the surface is small.

0.03" to 0.04" requires 1 sec.
or less at 10 kW or more
per sq. in.

0.1" to 0.2" with a large
mass of metal behind the
surface, requires 10-60 sec.
at 2 kW per sq. in.

Through hardening
requires 10-12 kWh per lb.

For further information, get in touch with your Electricity Board or write direct to the Electrical Development Association. Excellent reference books (8/6, or 9/- post free) are available on electricity and productivity—"Induction & Dielectric Heating" is an example.

E.D.A. also have available on free loan a series of films on the industrial use of electricity. Ask for a catalogue.

Issued by the
Electrical Development Association,
a Savoy Hill, London, W.C.2

GLOSCOAT

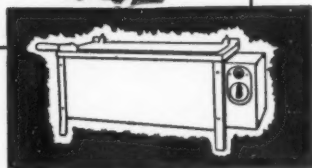
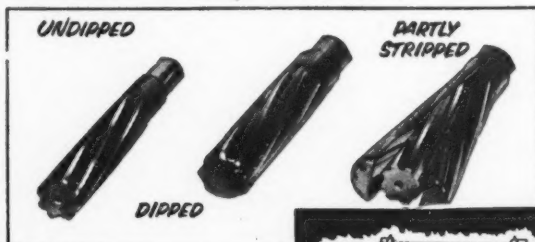
STRIPPABLE HOT DIP PROTECTIVE COATING

- ★ **REDUCES MAN-HOURS**
It reduces packing time by at least 60 per cent. in Man-hours.
- ★ **RESISTS CORROSION, RUST, etc.**
Adequate protection for the coated article against all forms of corrosion, rust, etc.
- ★ **PROTECTS FROM ROUGH HANDLING**
Protection against abrasion, mis-handling during transit.
- ★ **PROTECTS FROM HEAT AND COLD**
Protection under all conditions. Particularly in hot, humid atmosphere or in extremes of cold.

Manufactured by
GLOSTICS LTD., TUFFLEY CRESCENT, GLOUCESTER, ENGLAND

is a plastic protective packaging material for the protection of tools, machined parts and simple assemblies, and is applied by a simple dipping method. It is easily removed by peeling, leaving on the surface a thin film of lubricating oil.

The "Gloscoat" is melted in a suitable tank, electrically heated and thermostatically controlled. The articles are dipped in and out and in a few seconds the coating has chilled enough for the articles to be put down.



Sole Distributors in the U.K.

Write for Technical Details, Dept. F.3.5

J. M. STEEL & CO. LTD.

Head Office: 36-38 KINGSWAY, LONDON, W.C.2

Branch Offices: 51, SOUTH KING ST., MANCHESTER 2 • 45 NEWHALL STREET • BIRMINGHAM

Engineers always rely on Grey & Rushton's

British Precision . . .

MEASURING INSTRUMENTS (VERNIERS ALL TYPES)

140 Types and Sizes are Available



GREY & RUSHTON LTD, COVENTRY

ENGLAND

EXPORT ENQUIRIES WELCOME

Telephone: COVENTRY 60119

When answering advertisements kindly mention MACHINERY.

PARK GATE

QUALITY STEELS
IN THE NUCLEAR FIELD



Springs for Constant Support Hangers

by **SALTER** of WEST BROMWICH from PARK GATE Steel

for BRITAIN'S

NUCLEAR POWER STATIONS

THE PARK GATE IRON & STEEL COMPANY LIMITED ROTHERHAM

A  Company

TELEPHONE ROTHERHAM 2161 (18 lines)

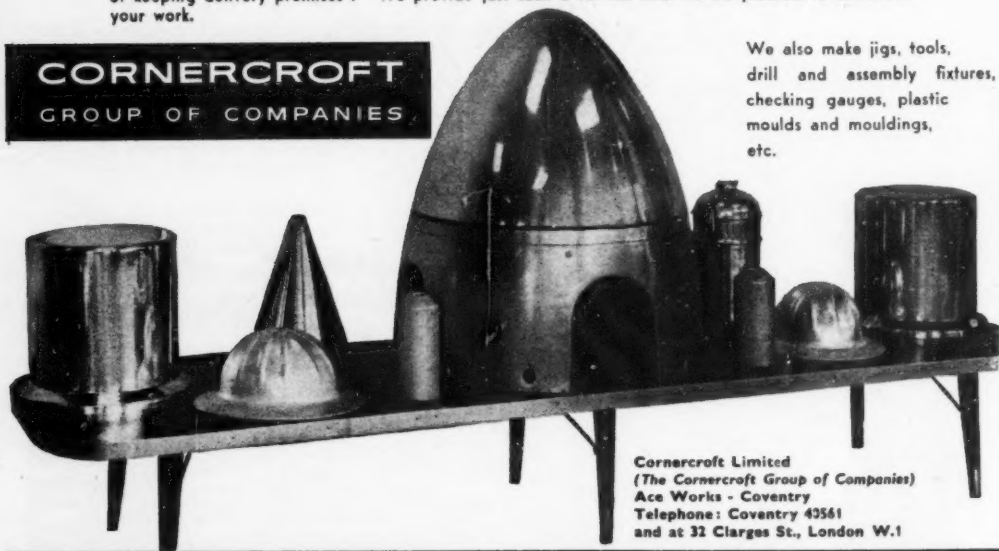
TELEGRAMS: YORKSHIRE, PARKGATE, YDPS

When answering advertisements kindly mention MACHINERY.

Are your spinnings pressing . . . your pressings urgent . . . ?

. . . in short, can you use a really reliable engineering service . . . capable of producing metal spinnings, pressings (and the tools) and sheet metal work of a very high standard . . . and capable of keeping delivery promises? We provide just such a service and will be pleased to undertake your work.

CORNERCROFT
GROUP OF COMPANIES



We also make jigs, tools, drill and assembly fixtures, checking gauges, plastic moulds and mouldings, etc.

Cornercroft Limited
(The Cornercroft Group of Companies)
Ace Works - Coventry
Telephone: Coventry 43561
and at 31 Clarges St., London W.1

ROSA JIG BORER

**THE MOST INEXPENSIVE HIGH PRECISION
MACHINE OF ITS CAPACITY, FINISH
AND QUALITY EVER PRODUCED**

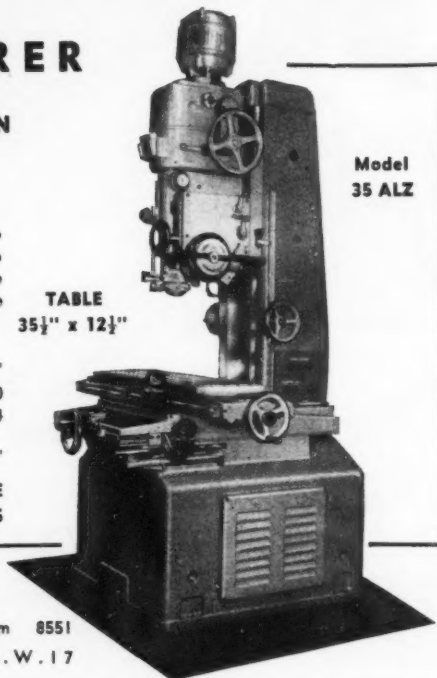
Infinitely variable speeds. Push button rise and fall to head for quick setting. Auto up and down feeds to spindle. Portable foot control switch for inching the spindle. Optical measuring by Hilger & Watts Scale Projectors. Remarkable ease of operation.

Table Travel Longit.	19 $\frac{1}{2}$ "	Boring Capacity in steel . . .	5 $\frac{1}{2}$ "
Table Travel Cross	12 $\frac{1}{2}$ "	Spindle Speed-R.P.M.	70-1300
Spindle Nose to Table	23 $\frac{1}{2}$ "	Spindle Feeds	4
Sliding Head Travel	19 $\frac{1}{8}$ "	Table Positioning	0-0002"
Drilling Capacity in Steel . . .	1 $\frac{1}{8}$ "	Accuracy	0-0002"

**50 YEARS • STOCK DELIVERY • EXPERIENCE
MANUFACTURERS OF WORLD FAMOUS ROSA DRILLS**

TABLE
35 $\frac{1}{2}$ " x 12 $\frac{1}{2}$ "

Model
35 ALZ



W. URQUHART Tel: BALham 8551
1023/7 GARRATT LANE • LONDON S.W.17

FASTER THAN EVER BEFORE



A & S

automatic cycle

MODEL 'O'

HORIZONTAL MILLER

Really fast Automatic Cycle Milling is now available on all machines in the popular 'A & S' 'O' Range of small millers. The table cycle, powered from the shop air supply, is hydraulically controlled during the cutting period, giving increased cutter life, improved finish and time cycles that will amaze you. At the last International Machine Tool Exhibition, for example, a machine was demonstrated on a time cycle of $1\frac{1}{2}$ seconds.

- Speed with safety: special built-in 2-handed safety precautions.
- 5 spindle speed ranges: from 150 to 4000 r.p.m.
- Rate of feed infinitely variable from zero to maximum by screw adjusted valve.
- Table size: $18\frac{1}{2} \times 5$ ".
- 4 other models available, with lever or screw hand feed, normal automatic and Multi-form feed.
- All sturdily built for long service (Weight approx. 1000 lbs.)

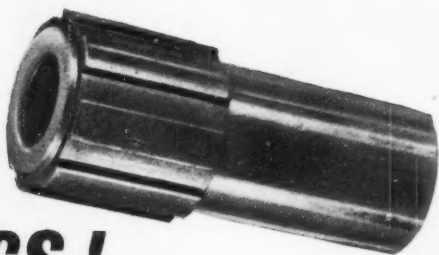
Built up to a standard—not down to a price

Write for illustrated brochure

ADCOCK & SHIPLEY LTD.

P.O. BOX No. 22, ASH STREET, LEICESTER. TELEPHONE: LEICESTER 24154-5-6.

NO MACHINING NEEDED WITH SINTERINGS!



**Sintered Simon says
Save on SINTERED**

Think of the savings you would make if you could eliminate machining! Impossible, you might think? No, not a bit of it. For so great are the advances made in recent years in powder metallurgy that it is now possible to produce a vast range of pieces in their finished state!

Already many manufacturers dealing in quantity production are taking advantage of these techniques. And at Sintered Products Limited, still further applications are being found daily to help industry achieve a faster, more economic production of parts. Perhaps they could help you?

Our Representative will gladly call to discuss your particular problems. Or write for the DURASINT booklet giving you full details to:

Sintered Products Limited

(One of the Sheepbridge Engineering Group)

Hamilton Road, Sutton-in-Ashfield, Notts.

Phone: Sutton-in-Ashfield 590 Grams: Sintered, Sutton-in-Ashfield

MARK YOUR NAMEPLATES — MORE RAPIDLY AND EFFICIENTLY

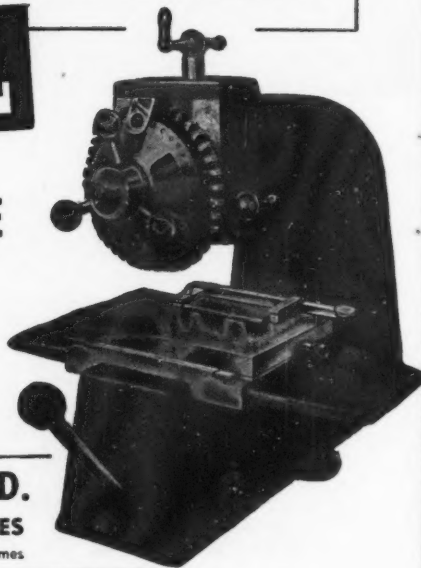
THE NEW STANDWELL

MODEL 'K' BENCH MOUNTING

DIAL TYPE MARKING MACHINE

Unique Features include:—

- Vertical adjustment to marking head.
- Rapid positioning for marking.
- Automatic spacing of characters.
- Perfect alignment of Type.
- Choice of character sizes.
- Special marks as required.
- Marks articles up to $\frac{7}{16}$ in. thick.



THE STANDWELL EQUIPMENT CO. LTD.
CAMBRIDGE GROVE ROAD, KINGSTON - ON - THAMES

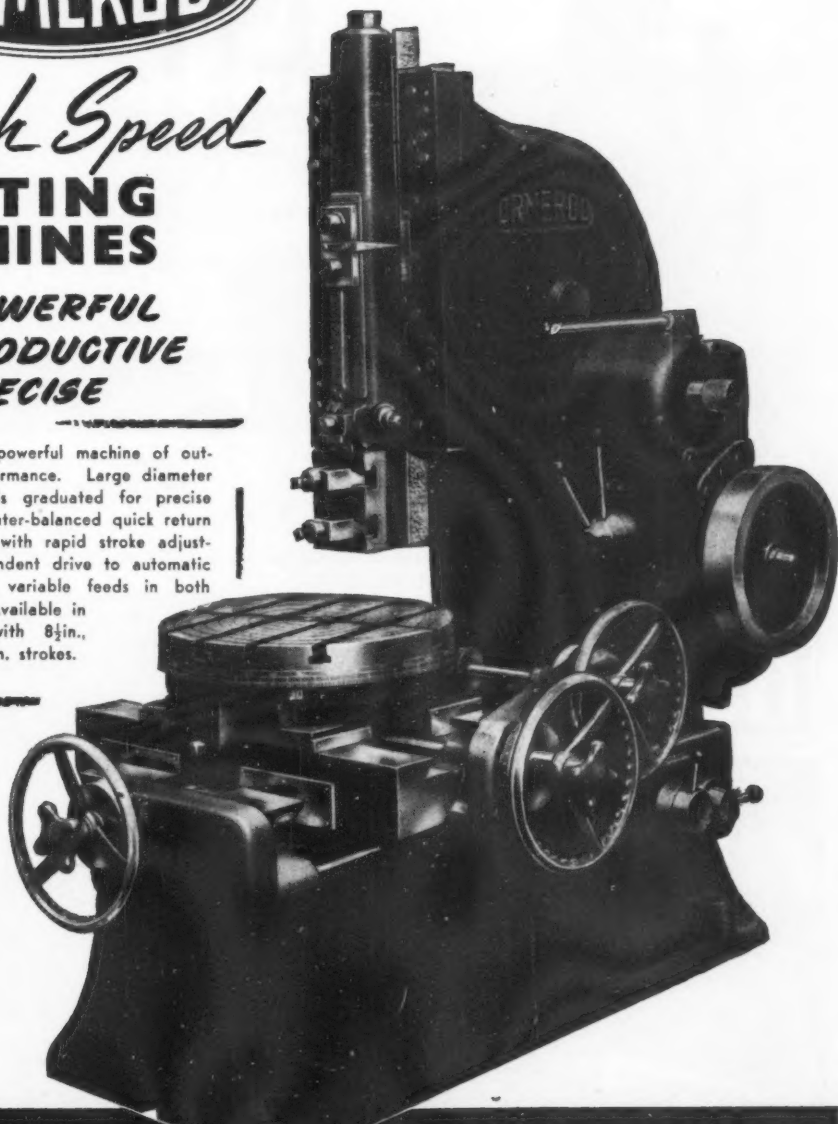
Phone: Kingston-on-Thames 4566 (3 lines) Grams & Cables: Impress, Kingston-on-Thames



High Speed **SLOTTING MACHINES**

- **POWERFUL**
- **PRODUCTIVE**
- **PRECISE**

A rigid and powerful machine of outstanding performance. Large diameter rotary table is graduated for precise setting. Counter-balanced quick return ram is fitted with rapid stroke adjustment. Independent drive to automatic traverses and variable feeds in both directions. Available in three sizes with 8½in., 10½in. and 13in. strokes.



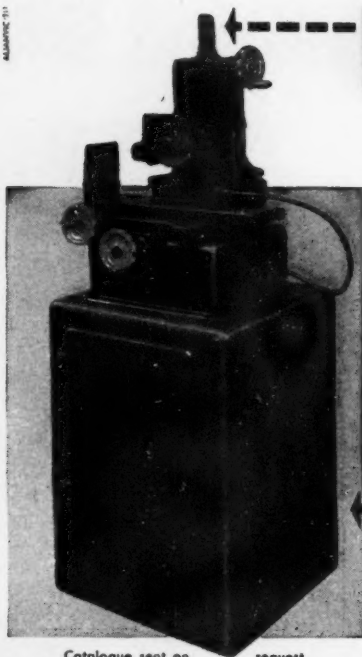
ORMEROD SHAPERS LTD.

HEBDEN BRIDGE • YORKS • ENGLAND

PHONE: 17 and 313 HEBDEN BRIDGE GRAMS SHAPERS • HEBDEN BRIDGE

When answering advertisements kindly mention MACHINERY.

ALAM 101



Precision bench surface grinding machine

LIP

Developed for the watch clock instrument and allied industries

Capacity : LENGTH 202 mm
BREADTH 108 mm
HEIGHT 125 mm

Surface of magnetic chuck :
105 x 152 mm.

Accessories available -

Stand
Dust extractor
Dressing diamond with holder universal vice

LIP INDUSTRY



BESANÇON : 7, rue des Chalets. Tél. 59-31

Agents for Great Britain : TORNOS SALES C^o

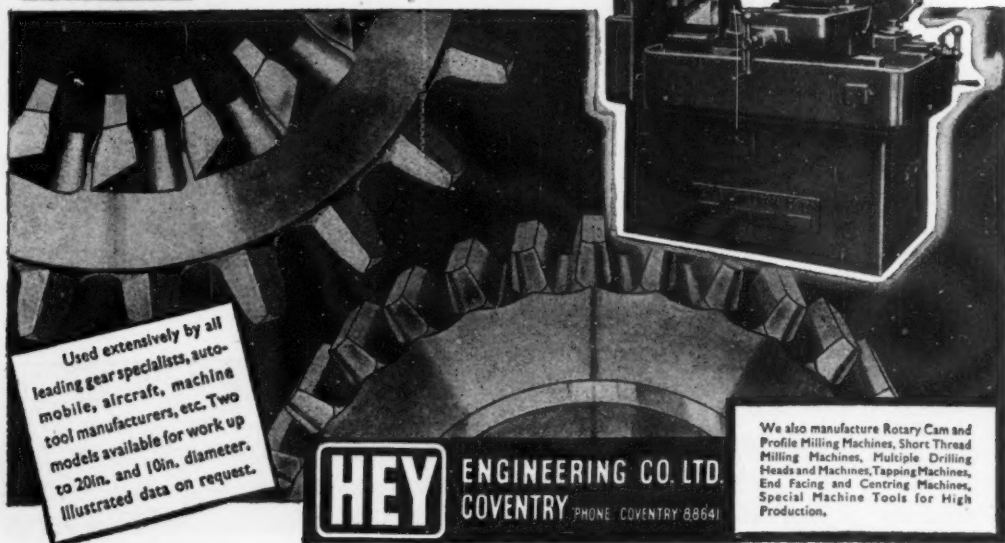
E. M. Vaughan Ltd
Broadgate House
COVENTRY

Catalogue sent on request



GEAR TOOTH ROUNDING and CHAMFERING MACHINES

Automatic operation, High Production Rates on External and Internal Gears, Starter Rings, etc.



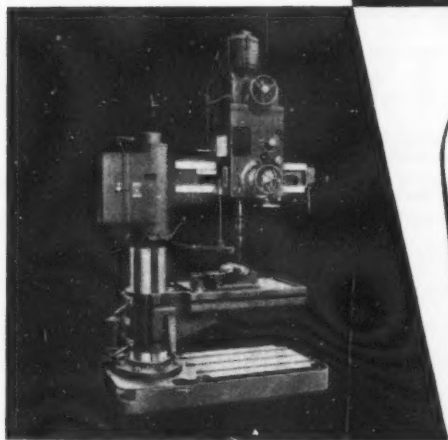
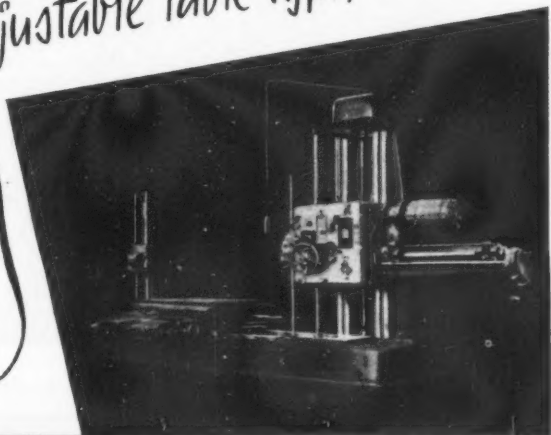
ENGINEERING CO. LTD.
COVENTRY

PHONE COVENTRY 88641

We also manufacture Rotary Cam and Profile Milling Machines, Short Thread Milling Machines, Multiple Drilling Heads and Machines, Tapping Machines, End Facing and Centring Machines, Special Machine Tools for High Production.

*Horizontal Boring and Milling Machines
Types CWC and HWC
Radial Drilling Machines with vertically
adjustable table type, WRS 25/08*

**Wide range of work
High output
First-class quality
High precision
Economy
Short delivery terms**



**Modern design
Easy attendance
Wide range of operation
Economy
Short delivery**

SOLE EXPORTERS



METAEXPORT

WARSZAWA · MOKOTOWSKA 49 · POLAND
Telegrams: METALEX WARSZAWA

**For particulars please contact
EMBASSY OF THE POLISH PEOPLE'S REPUBLIC · COMMERCIAL COUNSELLOR · 15, DEVONSHIRE STREET · W1**

When answering advertisements kindly mention MACHINERY.

HYDRAULIC CYLINDRICAL PRODUCTION GRINDING MACHINE SWISS-BUILT BY TSCHUDIN

Universal Workhead with infinitely variable speeds Universal wheelhead. All Feeds infinitely variable.

FEATURES AVAILABLE

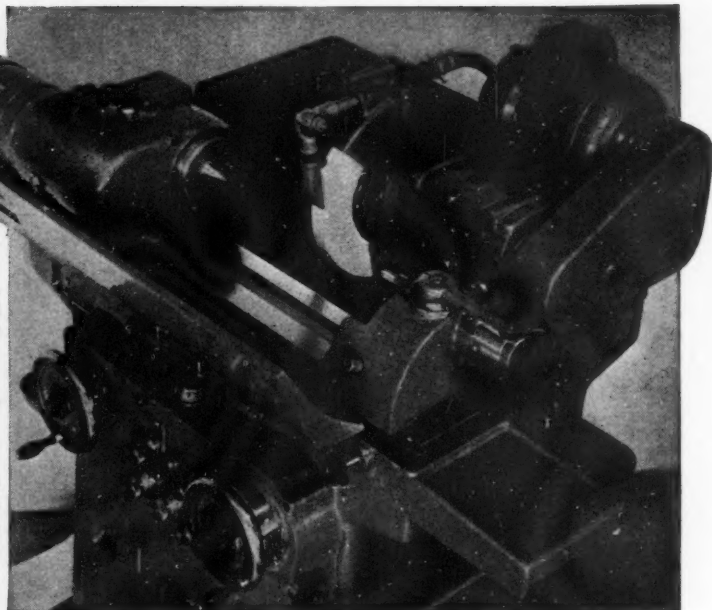
Internal Grinding Attachment.
Semi-Automatic Cycle.

Automatic Wheel Dressing
with Compensation.

AUTOMATIC DRESSING WITH
COMPENSATION to toler-
ance of .00004in. for Radii,
Angles, etc.

Sales & Service:

F·E·M



ENGINEERING CO., WOLVEY, NR. HINCKLEY, LEICESTERSHIRE. Tel: Wolvey 289

SPECIALISTS in used and reconditioned machine tools

USED MACHINE TOOLS FOR IMMEDIATE DELIVERY ★

ACME-GRIDLEY $\frac{3}{8}$ in., 1 in., 2 in., 2½ in.,
Six-Spindle Bar Automatics.

ACME-GRIDLEY 6 in. Six-Spindle
Chuckling Automatics.

B.S.A. ACME-GRIDLEY 1 in. Six-Spindle
Bar Automatics.

B.S.A. ACME-GRIDLEY 5½ in. Six-Spindle
Chuckling Automatic.

B.S.A. 168AL Single-Spindle Automatic
Screw Machines.

B.S.A. 5 in. and 9 in. Single-Spindle
Chuckling Automatics.

B.S.A. Multi-Tool Lathes, 6 in. x 12, 20 and
28 in.

B.S.A. No. 7 and No. 8 Centreless Grinding
Machines.

B.S.A. 50H Honing Machine.

B.S.A. LANDIS 6 in. x 30 in. Type C Plain
Grinders.

B.S.A. POTTER & JOHNSTON 5D
Automatic Turret Lathes.

AMERICAN Broaching Machine 10/48.

ASQUITH Two-Spindle Profiling Machine.

BRADFORD Lathe.

HERBERT Vertical Millers 10V, 18V, and
46V.

HOLROYD Two-Spindle Profiling
Machines.

HULLER No. 5 Tapping Machines.

INDEX "52" Single-Spindle Automatics.

LANDIS 10 x 24 Universal Grinder.

POTTER & JOHNSTON 5D Automatic
Turret Lathe.

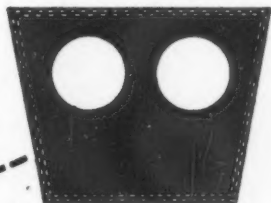
WARD 2A Capstan Lathes.

WARD OE Capstan Lathes.

★ Offered subject to prior sale.
All machines motorised suitable for
400-440 volts, 3 phase, 50 cycle supply.

We offer good prices for your surplus plant. Send
us details—we will inspect immediately and make
a firm offer. Write, wire or phone . . .

BGMACHINERY
(B.S.A. TOOLS GROUP) LTD.
MONTGOMERY STREET
BIRMINGHAM, II.
Phone VICTORIA 2351-9 Grams "REBUILT"



4 good reasons for fitting **BTR High Test V-BELTS**



**HIGHER
HORSEPOWER**

Grommet construction makes the most efficient use of high tensile cords to produce the strongest V-belts yet made. For grommet construction ensures that *all* the cords of a belt share the load *equally*—which is the condition for maximum transmitting efficiency. Furthermore, a grommet, being an endless loop of high tensile cords, has no joints to weaken the belt, no overlapping sections to stiffen it.



**MORE
GRIPPING POWER**

Grommet construction ensures that the belt exerts full driving grip on the walls of the pulley groove, for there are no central cords to dip and 'dish' the belt, pulling it away from the walls under load. This extra driving grip allows heavier loads and prevents belt slip.



**MORE OUTPUT FOR
ELECTRICITY CONSUMED**

Despite its superior strength, a grommet is the most flexible V-belt load carrying device yet developed. Thus the belt runs cool and absorbs minimum energy in flexing around the pulleys. This saving in power appears in extra pay-load for electricity consumed.



**LONGER
BELT LIFE**

Operating with a higher safety factor than ordinary V-belts, BTR grommet V-belts last longer because they are stronger and also because being so flexible they are subject to little strain in flexing round the pulleys.



BTR HIGH TEST GROMMET V-BELTS

Patented in Great Britain by BTR Patent No. 567406

BTR Industries Ltd HERGA HOUSE, VINCENT SQUARE, LONDON S.W.1 TEL: VIC 3848

D13.9

When answering advertisements kindly mention MACHINERY.

COOKE



OPTICAL DIVIDING HEAD

Now fitted with screen reading system, this instrument provides a standard of angular measurement to satisfy the most exacting requirement in engineering production. The direct system of measurement eliminates the usual sources of error associated with the mechanical dividing head. Write for List No. CE100C.

Cooke Troughton & Simms

YORK & LONDON LTD



Write NOW to DEPT. AM for particulars of complete range of Dial Gauges and Comparators, also Foot Lever presses and High-Speed Drilling Machines etc.

OLDAK DIAL GAUGES

ACCURATE · ROBUST · DEPENDABLE

Compare

THESE PRICES
0.0005in. or 0.01mm.
from £2.17.3
0.0001in. or 0.002mm.
from £5.4.6.

GENEROUS TERMS
TO
MERCHANTS

THESE FEATURES
Stainless steel rack
and pinions
Rotatable bezel
Revolution counter
Continuous and balanced readings on the same scale ring
Stainless steel hardened case stem

AND, of course, BSI accuracy and dimensions
MANUFACTURED SOLELY BY:

ENGINEERING PRODUCTS LIMITED

GLENBROOK WKS., LITTLERS CLOSE, MERTON ABBEY, LONDON, S.W.19

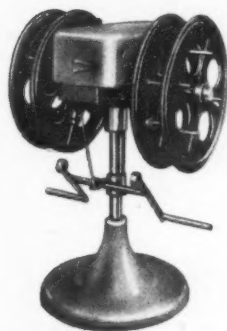
TELEPHONE: LIBERTY 1085 & 1086

When answering advertisements kindly mention **MACHINERY**.

PRESSING PROBLEMS

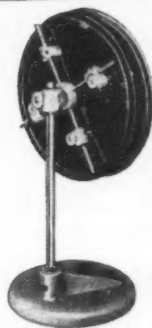
*call for***ATKIN
COIL HOLDERS**

● WIDEST RANGE
OF TYPES & SIZES



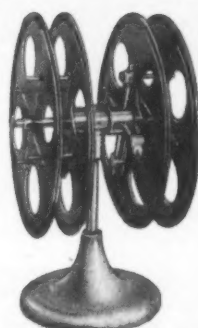
NON-INCLINABLE VERTICAL
DOUBLE-SIDED MOTORISED
MODEL ML20

Max. outside coil dia. ... 22 or 34in.
Min./Max. inside coil dia. ... 7/17in.
Maximum width of coil ... 6in.
Max. weight of each coil ... 3 cwt.
Feed ... 0-35 ft./min.



NON-INCLINABLE VERTICAL
MODEL A18.

Max. outside dia. of coil 22 or 34in.
Min./Max. width of coil 7/17in.
Max. coil width ... 6in.
Max. weight of coil ... 3 cwt.
Also available in larger size.



DOUBLE-SIDED VERTICAL
MODEL A36.

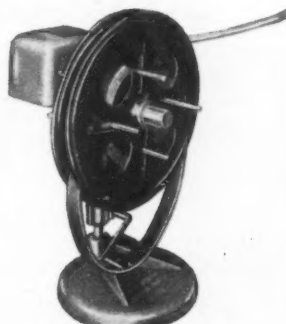
Max. outside dia. of coil 22 or 34in.
Min./Max. inside dia. of coil ... 8/17in.
Max. width of coil ... 6in.
Max. weight of each coil 4 cwt.



HORIZONTAL AUTOMATIC
BRAKING MODEL HB3

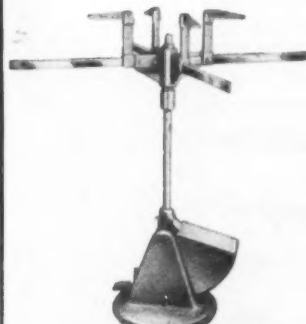
This model is mainly intended for wire coil. The automatic brake effectively prevents over run of stock.

Dia. of platform ... 36in.
Inside dia. of coil ... 9in.
Max. weight of coil ... 2 cwt.



NON-INCLINABLE VERTICAL
SINGLE SIDED MOTORISED
MODEL M1.

Max. outside coil dia. ... 22 or 34in.
Min./Max. inside coil dia. ... 7/17in.
Max. width of coil ... 6in.
Max. weight of coil ... 3 cwt.
Feed ... 0-35 ft./min.



HORIZONTAL COUNTER-
BALANCED MODEL HC4.

Max. outside coil dia. ... 30in.
Min./Max. inside coil dia. 12/18in.
Max. weight of coil ... 4 cwt.
Intended for wire coils only, this model is capable of being tilted for ease of loading. Counterbalance weight reduces effort when returning coilholder to operating position.

● MANUFACTURED BY

W. T. ATKIN

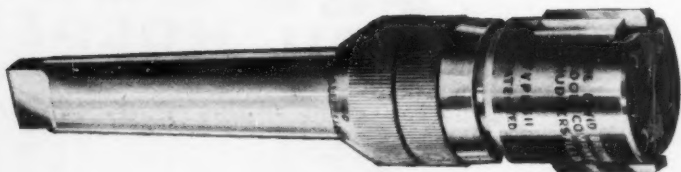
(TOTTENHAM)

LTD.

178 St. Ann's Road, London, N.15. Phone: Stamford Hill 6686-7 Grams: Pressing, Southtot, London

When answering advertisements kindly mention MACHINERY.

STOCKHOLDERS FLOATING REAMERS DAVID BROWN FROM $\frac{1}{2}$ " TO 8"



Our stock range comprising 21 different sizes covering bores from $\frac{1}{2}$ " to 6" includes the 'S.O.' series for sizes $\frac{1}{2}$ " to $\frac{3}{4}$ " fitted with High Speed Steel Blades suitable for reaming through bores only, 'S' series for sizes $\frac{3}{4}$ " to 6" fitted with High Speed Steel Blades or Tungsten Carbide Tipped Blades, and 'S.L.' series for sizes $\frac{3}{4}$ " to 6" fitted with High Speed Steel Blades, or Tungsten Carbide Tipped Blades specially extended for finishing blind or stepped bores.

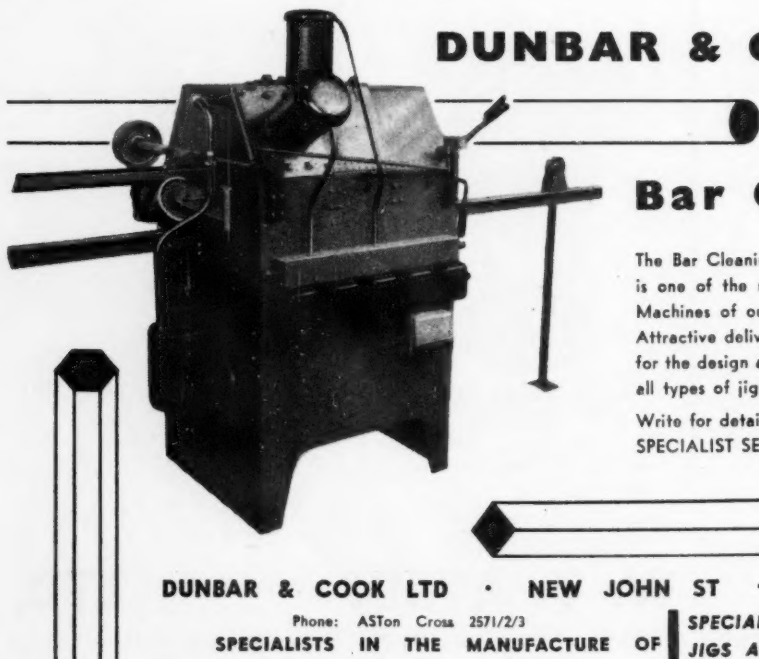
GEORGE HATCH LIMITED

3, QUEENHITHE, UPPER THAMES STREET, LONDON, E.C.4.

Telephone: CENTral 7751.

EVERYTHING FOR ENGINEERS

Established 1862.



DUNBAR & COOK LTD

Bar Cleaner

The Bar Cleaning Machine illustrated is one of the many Special Purpose Machines of our manufacture. Attractive deliveries are offered for the design and manufacture of all types of jigs and fixtures.

Write for details of our SPECIALIST SERVICE.

DUNBAR & COOK LTD • NEW JOHN ST • BIRMINGHAM 6

Phone: ASTon Cross 2571/2/3

SPECIALISTS IN THE MANUFACTURE OF

SPECIAL PURPOSE MACHINES
JIGS AND FIXTURES

When answering advertisements kindly mention MACHINERY.

*Specialists**Stockists &**Distributors*

*Guaranteed
to ± 0.001 in
thickness*

PRECISION**CARBON CHROME ALLOY STEEL****GROUND****FLAT****STOCK**

INDISPENSABLE IN THE
MANUFACTURE OF JIGS,
TEMPLATES, GAUGES, PRESS
TOOLS, ETC., OIL HARDEN-
ING, NON-DISTORTING STEEL
IN STANDARD 18in. LENGTHS.
EACH PIECE SEPARATELY
PACKED WITH FULL HEAT
TREATMENT INSTRUCTIONS.
STANDARD 18in. LENGTHS
ALSO NON-STANDARD SIZES
12in., 24in. & 36in. LENGTHS.
WIDTHS FROM $\frac{1}{2}$ in. to 12in.
THICKNESSES FROM $\frac{1}{8}$ in. to
2in.

**30,000 LENGTHS
ALWAYS IN STOCK**

Write for Specifications and Prices

MAIN STOCKHOLDERS & DISTRIBUTORS

T. NORTON & CO. LTD

CARVER STREET : BIRMINGHAM 1.

Telephone: Central 4325 (5 lines)



When answering advertisements kindly mention MACHINERY.



Manloves

Manloves

Manloves

Manloves

CENTRIFUGAL

OIL

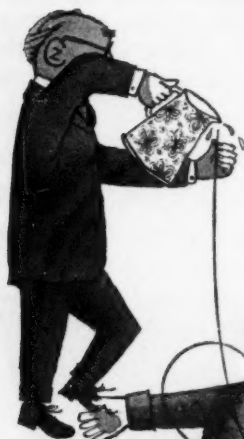
SEPARATORS

A ready and simple means of recovering OIL from swarf, nuts, bolts, screws, etc.

MANLOVE ALLIOTT & CO LIMITED
BLOOMSGROVE WORKS · NOTTINGHAM

Phone: NOTTM. 75127 (3 lines) GRAMS: MANLOVES, NOTTM. LONDON OFFICE: 41 & 42 PARLIAMENT ST. WESTMINSTER SW.1. Phone: WHITEHALL 5931-2

We go to any lengths ^{of metal tubing!} at ELLAY'S . . .

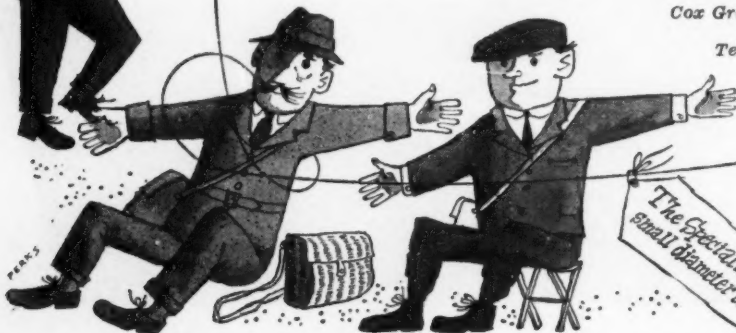


. . . Any lengths to serve you, naturally—and in a range of small diameter, non-ferrous metal tubing, anywhere between 3/32" to 20' 0" long in the 3/64" to 1" o.d. range (0.006" to 0.064" wall thickness). We can supply in aluminium, brass, or copper (h.c. and o.f.h.c.) in precision, close or general purpose tolerances. We can bend, turn, press and fabricate to your exact specification. Above all, you are assured of absolute consistency, low cost and the right tubing for the job—whatever lengths you put us to.

Also—Precision fabricated tubular products in non-ferrous metals to customer's specifications.

ELLAY
Tubes
 LTD.

ELLAY TUBES LIMITED
 Cox Green Works, Maidenhead,
 Berks.
 Tel.: Maidenhead 3303

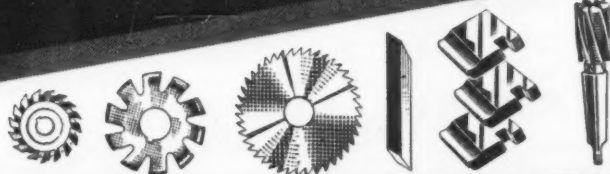


The Specialists in
 small diameter tube



efficiency through **RATIONALIZATION**

tools



from

HALLMAC



ALL your needs in Engineers' Small Tools, Macrome Treated Tools, Hand and Power Tools from ONE SOURCE. The time, effort, thought and paperwork entailed by piecemeal ordering saved permanently by the single decision *tools from Hallmac*. Rationalise your buying by making use of Hallmac's immense and comprehensive stock ranges and of their countrywide distribution and service network.



HALLMAC TOOLS LIMITED

Head Office and Depot: PO Box No. 39, Macrome Road, Wolverhampton. Telephone: 52001 (9 lines)

LONDON: 21 Ivor Place, N.W.1. Telephone: PADdington 0204

MANCHESTER: Transport House, 1 The Crescent, Salford, 5, Lancs. Telephone: PENdleton 3656

GLASGOW: Central Chambers, 11 Bothwell St., C.2. Telephone: CENTral 5066

Sales Managers for the Hand Tool Division of the Bren Manufacturing Company

When answering advertisements kindly mention **MACHINERY**.

JW.Ad 4309.

" This calls for very high quality foundry work "
" It calls for WILLAN quality steel castings "

Is the problem a limited run of high quality steel castings? Willans are the people for that job. They manufacture to the highest standards in all alloy, stainless and heat-resisting steels and use extensively non-destructive inspection testing. Castings can be supplied in any weight from a few ounces to 6 cwt. They can also melt and cast in a vacuum in special cases. If the accent is on quality, rather than on quantity, call in Willans at once!



G. L. WILLAN (CASTINGS) LTD

Sussex Street, Sheffield, 4.

Telephone 24211.

OA/5103



FOR *Precision* SURFACE GRINDING

EXE TOOLROOM SURFACE GRINDER

All slides are Meehanite or similar high duty iron for long life. The hand operated traverse motion is easily and smoothly worked by means of a balanced aluminium handwheel and helical pinion running on ball bearings.

Interchangeable high speed spindle available for grinding recesses, etc. Bench or cabinet models—the cabinet model has self-contained dust collector.

Grinding capacity 12" x 6"

Send for illustrated brochure to Sole World Distributors

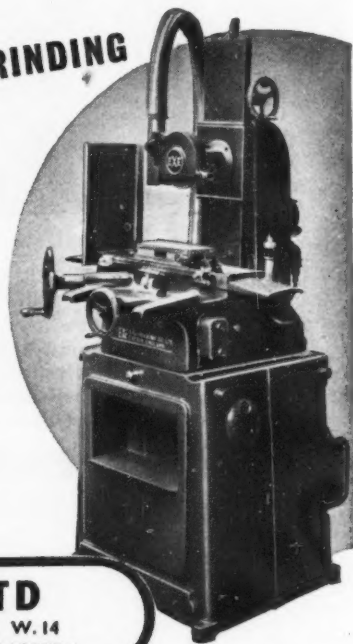


DOWDING & DOLL LTD

346 KENSINGTON HIGH STREET, LONDON, W.14

Telephone: WESTERN 8077 (3 lines)

Telegrams: ACCURATOOL HAMMER LONDON



When answering advertisements kindly mention MACHINERY.



CLEAN CAST INTRICATE SHAPES CUT MACHINING COSTS



Our specialised equipment, including the most up-to-date electric melting furnaces, mechanical handling and heat-treatment plant, is capable of meeting all your needs for castings in carbon and alloy steels.

Close laboratory control at every stage—rigid adherence to specification, physical and metallurgical—dimensional accuracy and surface finish—ensure that BAKERSTEEL castings meet your every demand.

Capacity from a few pounds to 30 cwt.

Specify

Bakersteel

CARBON & ALLOY STEEL CASTINGS

W. A. BAKER & CO. LTD. WESTGATE WORKS, NEWPORT, MON. PHONE: NEWPORT 64845

DIVISION OF BLACK-CLAWSON INTERNATIONAL, LIMITED — MAKERS OF PAPER MILL PLANT

When answering advertisements kindly mention MACHINERY.

N

* *At this moment*

THE *British* **VARIABLE
SPEED
UNIT**

IS IMPROVING MACHINE PERFORMANCE
IN ALL THESE INDUSTRIES . . .

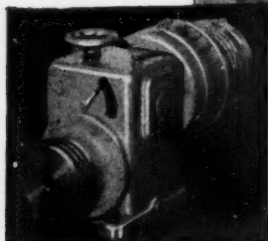
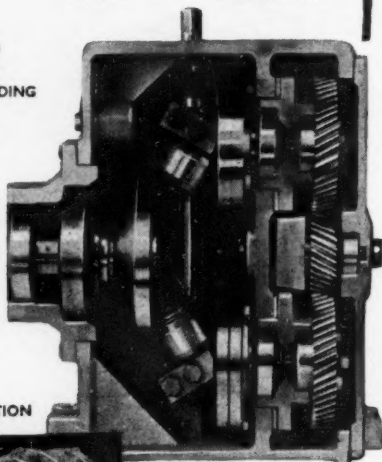
PAPER MAKING
PRINTING
CARDBOARD
MAKING
MECHANICAL
HANDLING
RUBBER
MANUFACTURE
PLASTICS
TEXTILES
DYEING

MACHINE TOOLS
PETROLEUM OIL
SOAP WORKS
WELDING
BISCUIT MAKING
BREWERY
MACHINERY
FOOD
PROCESSING
SUGAR REFINERY
FOUNDRY

CHOCOLATE
REFINERY
CABLE
MANUFACTURING
WIRE-DRAWING
CERAMIC
INDUSTRY
COLLIERIES
INDUSTRIAL
HEATING
CHEMICAL PLANT

SLIP PROOF
CONSTANT
SPEED HOLDING

NOTE THE
COMPACT
STURDY
CONSTRUCTION



SEVEN STANDARD
SIZES INPUT SPEED
1,430 R.P.M.
INFINITELY VARIABLE
OUTPUT SPEEDS
UP TO 1,800 R.P.M.
POWER OUTPUT FROM
0.15 TO 18 H.P.
ACCORDING TO SIZE.

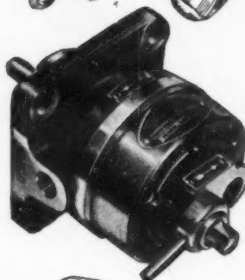
Write today for full details to

F. U. LONDON LTD.

WRENCOTE HOUSE,

119/121 HIGH ST., CROYDON, SURREY

TELEPHONE : CROYDON 8296



*More accurate
than human skill
itself* -----

* *Hydraulic Control of motion*

Paradoxically, the product of human skill is more accurate than human skill itself. This is particularly so in the case of Savery Hydraulic Pumps. Countless thousands of Savery Pumps are in use throughout the world working with precision that neither human skill nor other means can match. Next time you're considering control of motion, remember Savery Hydraulic Pumps first. Savery Pumps can be supplied with fixed or variable delivery.

FOR FURTHER DETAILS OF
SAVERY HYDRAULIC PUMPS
WRITE TO

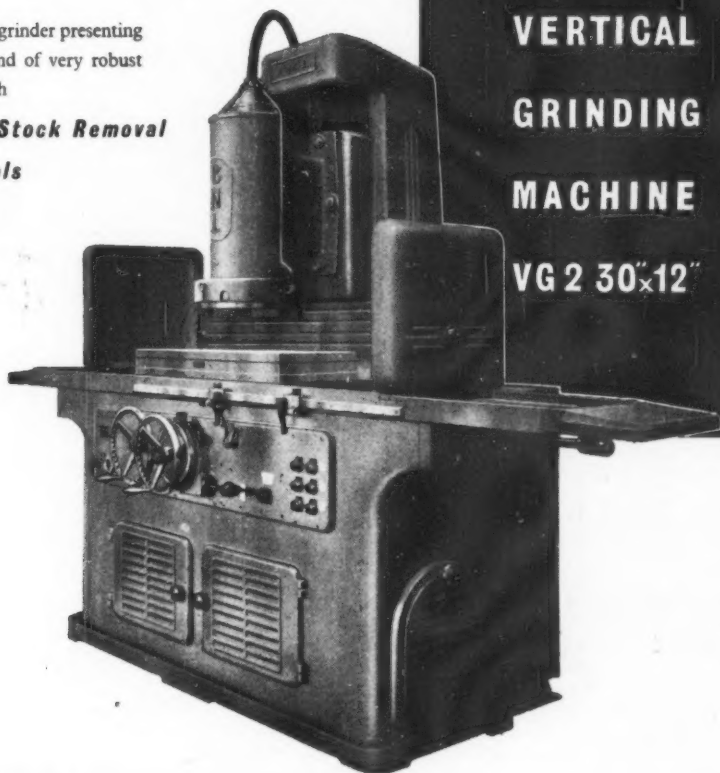
THOMAS SAVERY PUMPS LIMITED
BRACEBRIDGE STREET · BIRMINGHAM 6
Telephone : ASTON Cross 1316-7

When answering advertisements kindly mention MACHINERY.

THE BRITISH NORTHROP

An ultra-modern precision grinder presenting a large working surface and of very robust and rigid construction, with

- *A High Rate of Stock Removal*
- *Sensitive Controls*
- *Hydraulic Feed*



**VERTICAL
GRINDING
MACHINE
VG 2 30"x12"**



TABLE

working surface, length x width	30" x 12"
longitudinal traverse	45"
table speed	0-48 ft/min
admits between table and wheel	12"

HEAD

vertical movement of wheelhead	13"
speed of wheel	1420 r.p.m
peripheral speed of wheel	4750 ft/min
diameter of wheel	12"
movement of head per revolution of handwheel . . . . .	.050"

Write for full particulars to—

BRITISH NORTHROP LIMITED • BLACKBURN • ENGLAND

BN 29

When answering advertisements kindly mention MACHINERY.

N2

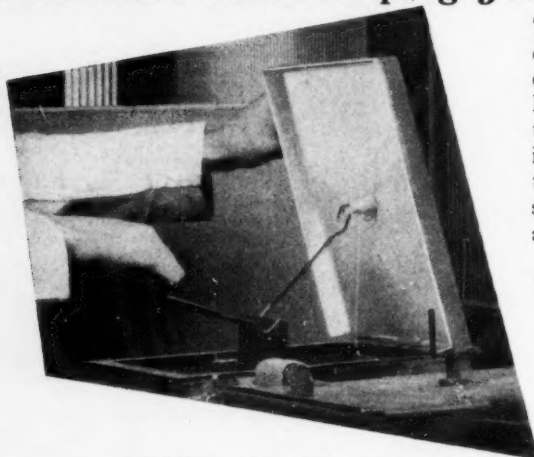


SUMMIT

MILLING CUTTERS - SLITTING SAWS
REAMERS - GEAR CUTTERS - HOBS
END MILLS - PARTING OFF TOOLS
CIRCULAR SHEARING CUTTERS
BEVEL KNIVES - CIRCULAR FORM
TOOLS

JOSEPH THOMPSON (SHEFFIELD) LIMITED
Townhead Street Engineering Works, Sheffield 1, England Telephones: 24021 (Three lines) Telegrams: "Summit, Sheffield"

Are these hands helping *you*?



These hands are but a pair among many engaged in the continuous testing and experimental work carried out in P.J. laboratories, where skilled paint technicians tackle the complex problems which confront industrial paint users. Your area P.J. technical representative will bring you the services of this team of experts to advise and assist you with your finishing problems.

You can rely on

**PINCHIN
JOHNSON**

for Paint and Service

PINCHIN, JOHNSON & CO., 4 CARLTON GARDENS, LONDON, S.W.1

Telephone: TRAFALGAR 5600

LOCAL BRANCHES & STOCK DEPOTS:

BELFAST:
Daiton Buildings, Dalton Street.
Belfast 58643

BOOTLE, 20:
72 Brewster Street.
Liverpool, Bootle 2121

BRIGHTON, 1:
26-27 Elder Place. Brighton 23739

BRISTOL, 8:
21 High Street, Clifton. Bristol 33889

GLASGOW, C.2:
Ocean Chambers, 190 West George St.
Douglas 3281-2

LEEDS, 11:
123 Water Lane. Leeds 24377

MANCHESTER, 3:
22 Bridge Street. Blackfriars 3800

NEWCASTLE-ON-TYNE, 1:
Pudding Chare.
Newcastle-on-Tyne 21919

SOUTHAMPTON:
41 Lower Canal Walk.
Southampton 23648

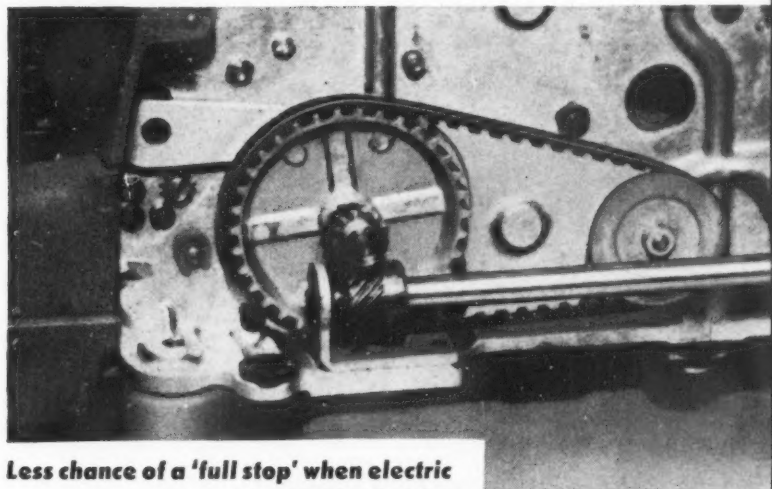
When answering advertisements kindly mention MACHINERY.

POWERGRIP TIMING BELT

**puts precision into
your power
transmission**



From 1/100th to 300 horsepower—U.S. PowerGrip Timing Belts offer efficiency close to 100%. Tough neoprene teeth, embedded with steel cables of high tensile strength, fit firmly into grooved pulleys giving positive non-slip transmission. PowerGrip eliminates need for lubrication and tensioning devices, and offers far more versatile drive.



Less chance of a 'full stop' when electric typewriters rely on POWERGRIP

In this electric typewriter a POWERGRIP Timing Belt is used to operate the key striking and carriage return mechanism. POWERGRIP provides a compact, synchronised drive; contributes to silent operation; and improves the typewriter performance, giving uniform appearance and clarity of print.

The list of machines and appliances using **POWERGRIP** grows daily.

Here are some of the more recent additions:—

United States
Atomic Submarine
'Nautilus'
Washing machines
Electric refrigerators
Vacuum cleaners
Cement plant kilns
Industrial water cooling equipment
Oil field machinery
Office machinery
Paper machinery
Textile machinery
Milling machinery
Camera and photo processing equipment
Colour TV scanning disc
Cotton oil plant
Linters and cookers
Fans and blowers
Radio and radar antenna drives
Gas and liquid compressors
Generators and exciters
Laundering machinery
Power hand tools
Printing machinery
Sewing machines
Woodworking equipment
Centrifuges

Our experts can help you to solve your power transmission problems. Write now to



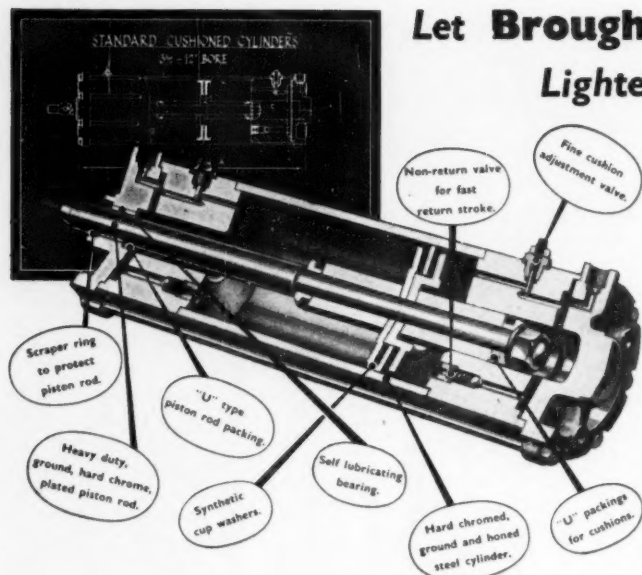
U. S. Rubber

Home: The North British Rubber Company Limited, Abbey 7135
Export: U.S. Rubber International (Great Britain) Ltd. Abbey 2053

62/64 HORSEFERRY ROAD, LONDON, S.W.1

When answering advertisements kindly mention MACHINERY.

Let Broughton Air Cylinders Lighten your Load . . .



Broughton Pneumatic Equipment offers unlimited smooth fast flexible power for all types of automatic movements, transfers on machines, fixtures and feeds.

Broughton "Bull" Air Cylinders are ideal for all types of clamping operations, converting hand presses, foot presses and guillotines to power machines, eliminating fatigue, and increasing production and usefulness of machines. These are only a few of the jobs where air cylinders can help to increase efficiency.

Our Technical Staff is at your service to discuss any application you may require.

J. BROUGHTON & SON (ENGRS.) LTD.

SECURITY WORKS FACTORY CENTRE, BIRMINGHAM 30.

TELEPHONE: KING'S NORTON 3305/6/7

Die Sinking

FOR THE RUBBER, GLASS, AUTOMOBILE & AIRCRAFT INDUSTRY
SCANNING, PROFILING & ROTARY FORMING

from customers' own models, castings or materials if desired
CAPACITY UP TO 26in. by 34in. or 48in. by 15in. area or 24in. dia. by 30in. high

JIGS, TOOLS AND FIXTURES

SPECIAL MACHINES, WOOD METAL & PLASTER PATTERNS & MODELS

DROP HAMMER AND DRAWING TOOLS

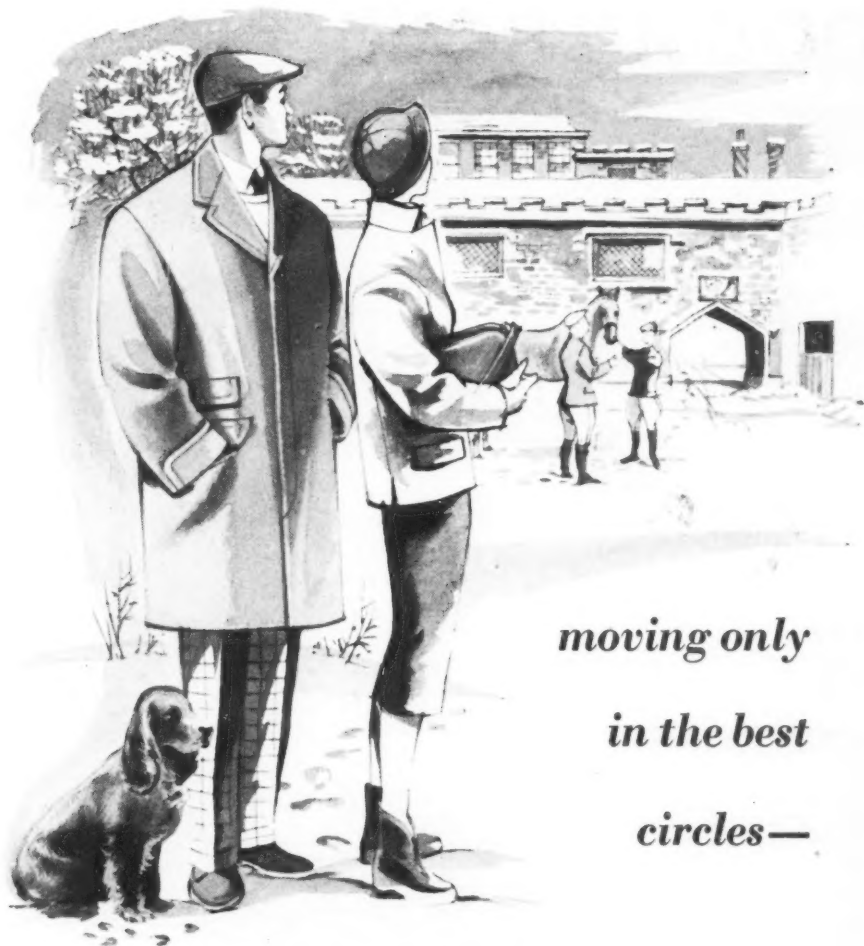
for the Aircraft and Automobile Industry by precision cast-to-form methods
in cast iron and zinc base alloys

CASTINGS OF ALL TYPES (except Steel)

● FINCH WATSON LIMITED ACCRINGTON.

Phone: Accrington 5238/9

When answering advertisements kindly mention MACHINERY.



*moving only
in the best
circles—*

The **QUALCUT** twist drill

*the polished drill
with the polished performance—*

look for the



QUALCUT TOOLS LIMITED

Worksop Road, Sheffield 9,

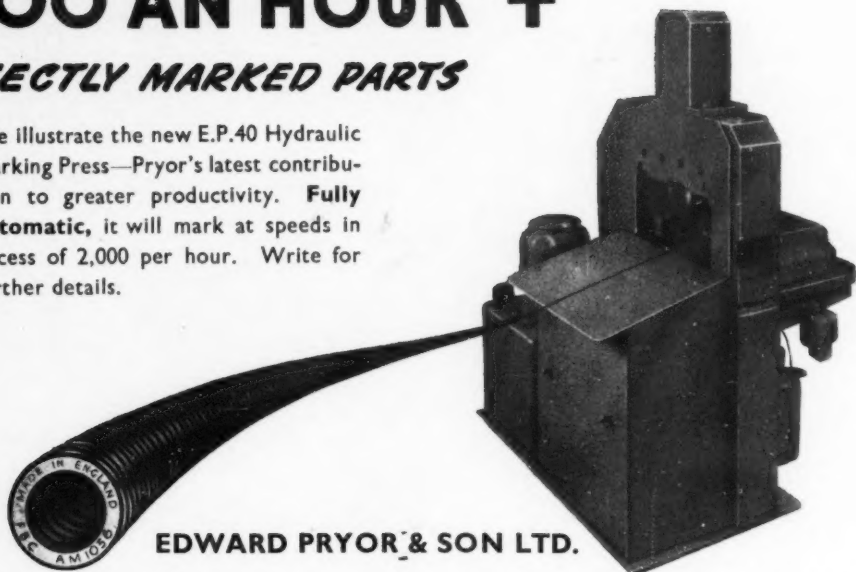
Telegrams and cables: "Qualcut" Sheffield 9. Telephone 4102314

When answering advertisements kindly mention MACHINERY.

2,000 AN HOUR +

PERFECTLY MARKED PARTS

We illustrate the new E.P.40 Hydraulic Marking Press—Pryor's latest contribution to greater productivity. **Fully automatic**, it will mark at speeds in excess of 2,000 per hour. Write for further details.



EDWARD PRYOR & SON LTD.

BROOM STREET : SHEFFIELD : ENGLAND

Telephone: Sheffield 23161 (5 lines)
Telegrams: Pryor Sheffield

**All types of press work
up to 150 tons —
any metal**

**Deep draw work
a speciality**

**Also milling, drilling,
capstans and
assemblies**

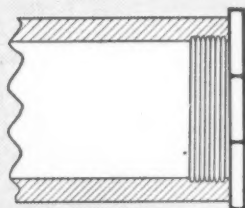
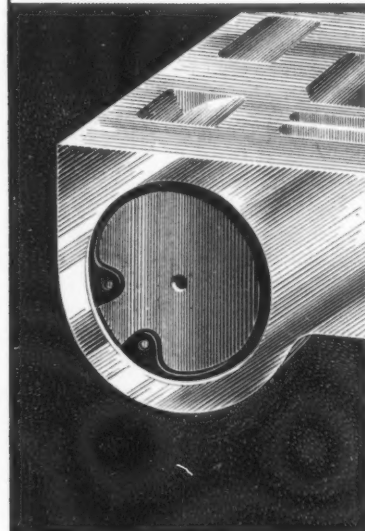


Corfield & Buckle Ltd

TRAFALGAR WORKS · MERTON ABBEY
LONDON S.W.19 Telephone: LIBerty 1144 (7 lines)

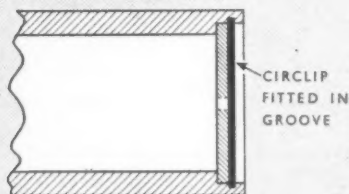
When answering advertisements kindly mention MACHINERY.

The logical advance in Retaining



OLD WAY

This fluid seal involved internal threading of the tube, which was sealed with an expensive cap-nut. The assembly was laborious and spanners were needed.



THE SALTER WAY

The tube is recessed and then simply grooved with the SALTER Grooving Tool. A Circlip is snapped into position and secures the fluid retaining plate with positive, vibration-free locking. When necessary the Circlip can be removed quickly and easily.

save material — reduce assembly time — **cut costs**

When it's a question of assembling components in any engineering field, Salter Retainers are the answer. They replace nuts and bolts, screws, cotter pins, and eliminate expensive threading

and machining operations. A large standard range is at your immediate disposal, and we should welcome the opportunity to assist in developing special retainers to solve your problems.

Send for the Salter Retainer catalogue — no designer is complete without it.

NEATER — MORE POSITIVE — PERMANENT RETAINING

SALTER



Circlips



Fasteners



Retainers



Fixes

Geo. Salter & Co. Ltd., West Bromwich • Spring Specialists since 1760

PI-WV, 648

When answering advertisements kindly mention MACHINERY.

SCREW THREAD INSPECTION...



by O-Vee screw thread gauges

Simple, quick and accurate measurement on the principle of the three wire system is available without complicated calculations, reference books or tables. Why wait for expensive gauges when immediate delivery is available of O-VEE SCREW THREAD GAUGES which cover a wide range of diameters and pitches.

The O-Vee gauge in conjunction with a standard micrometer would indicate whether the effective diameter of a thread is within tolerance.

by O-Vee comparators

There are three models of O-Vee comparators available which cover a wide range of threads and are quickly and easily set for different sizes and pitches without the use of special gauges. The "easy to read" scale quickly shows whether the effective diameter of the thread is within limits and gives an accurate reading of size. Inspection by the O-Vee method means lower costs and better fitting threads. Our information service is at your disposal without obligation. Please write to:—

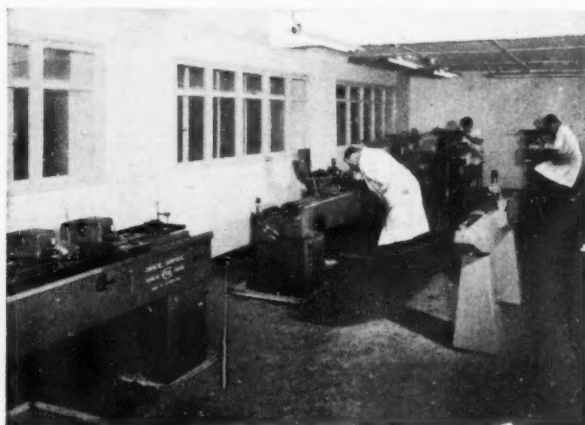
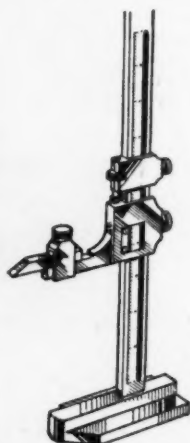


O-VEE *Spring* **GAUGES** LTD

Dept. M, 1, St. Kilda's Road, Harrow, Middx.
Telephone: Harrow 0662

DHB 7468

Benson
Regd.



Engraving and Linear dividing

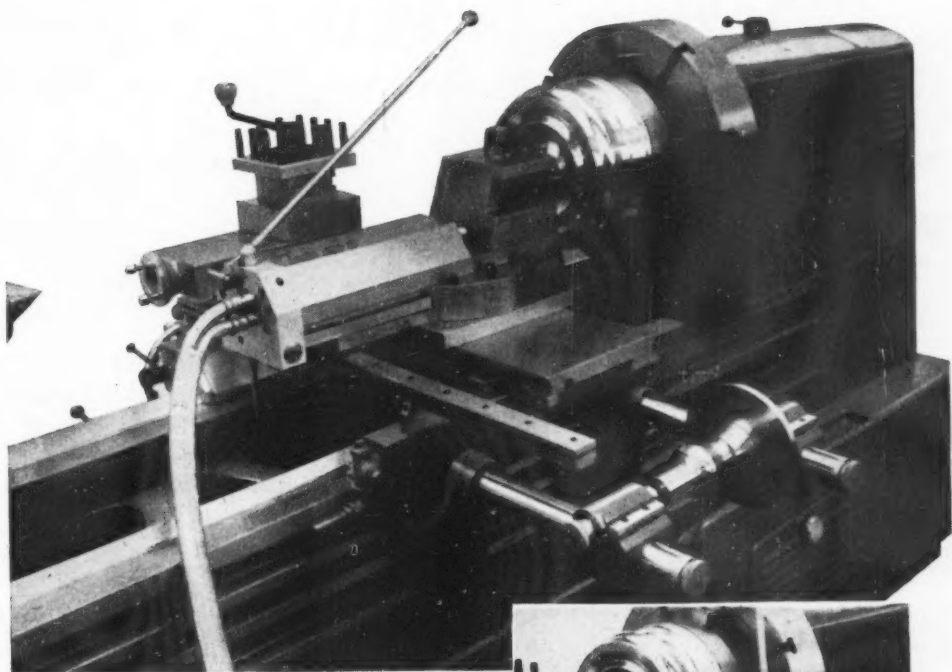
SPECIALISTS IN...

VERNIER CALIPERS • KNIFE EDGE VERNIERS • VERNIER HEIGHT GAUGES
GEAR TOOTH CALIPERS • DEPTH GAUGES • STEEL BEAM TRAMMELS
VERNIER GAUGES TO INDIVIDUAL REQUIREMENTS
SPEEDY AND EFFICIENT REPAIR SERVICE
GRADUATED SCALES FOR MACHINE TOOLS

BENSON VERNIERS, CARLTON WORKS, CARLTON ST., BRADFORD, 7
TELEPHONE: BRADFORD 26894/5
TELEGRAMS: "VERBENA"



NOW... copy **LATERALLY** as well as longitudinally - with the *NEW* CAZENEUVE Copying Attachment



This new "Universal" Hydraulic Copying Attachment allows for *lateral* as well as longitudinal copying. It is available for Cazeneuve HB 500, HB 575 and HB 725 lathes. With it you can make finishing cuts straightaway, without removing the component after the roughing operation. It has automatic lubrication and its capacity is about equal to that of the lathe.

Write to Fenter for full details today!



for the

CAZENEUVE

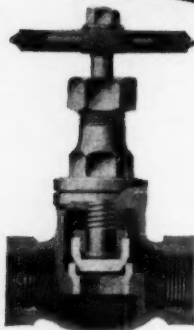
Fenter Machine Tools Ltd, 184 Aston Road, Birmingham 6 ★ Telephone: ASTon Cross 1551/2/3

When answering advertisements kindly mention MACHINERY.

HOPKINSONS' BRONZE VALVES

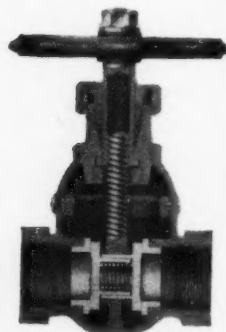
sizes up to 2" bore

**IMMEDIATE
DELIVERY
FROM STOCK**



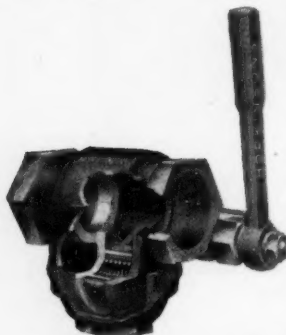
"S. T. S." VALVES

Sturdy general-purpose valves for isolating or regulating purposes. Screwed or flanged connections available.



PARALLEL-SLIDE VALVES

Reliable general-purpose valves for duties where the flow is in either direction. Screwed or flanged connections available.



LINK VALVES

Robust quick-opening valves on parallel-slide principle. Easy to operate, suitable for many duties including process steam control, compressed air, thick heavy liquids, etc. With screwed connections.

All the above valves are for pressures up to 250 lb/sq. in. (steam) or 350 lb/sq. in. (cold water, air, oil, etc.)



HOPKINSONS LIMITED • HUDDERSFIELD
London Office: 34 NORFOLK STREET STRAND • W.C.2.

H.V. 113

Indexing

AUTOMATIC MULTI-SPINDLE DRILL HEAD

SIZES

5" / 16"
1" / 2"
5" / 8"

4, 5 and 6 Tool Stations
Collets, Chucks, Tapping Head, Turret Depth Stop, Pre-selector Variable Speed Drive
EMBASSY MACHINE & TOOL COMPANY LTD.

248, Watford Way, Hendon, London, N.W.4.

Phone: SUNnyhill 2829

FMP

Ground Flat Stock

● Simple to heat treat, non-deforming and hard wearing, FMP ground flat stock is precision ground to limits of 0.001 in. A wide range of standard sizes is available from 1/8 in. to 1/2 in. thick by 1/2 in. to 6 in. wide in 18 in. lengths. Order a trial supply for use on your gauges, jigs, templates and machine parts. Also available: Ground Round Stock Twist Drills, Files, Hacksaw Blades, etc.

F. M. PARKIN (SHEFFIELD) LTD.

ST. THOMAS STEELWORKS, A1 LEWOOD RD SHEFFIELD, 8

also Warehouses, London & Birmingham
Phone: Sheffield 50083 (5 lines) Grams: Sorbittic Sheffield, 9

Who foots that RUST bill — you or your customer ?

Steel parts or assemblies in transit are easily attacked by RUST if they are not suitably protected. Do you lose interest in your products after they leave your Despatch Department? Your customers shouldn't be faced with a bill for RUST damage in transit. There need not be a rust bill anyway, if your products are RODOL protected. RODOL anti-rust treatments are easily and economically applied and they give complete and positive protection.



THERE IS A COMPLETE RANGE OF **RODOL** PRODUCTS
Included in the RODOL series of rust preventives are materials to protect steel against all hazards — inter-process protection, anti-rust treatment in storage or transit, de-watering fluids or protection before a permanent finish is given. Ask for samples and literature.

RUST IS INDUSTRY'S BIGGEST SPOILER

DEFEAT IT WITH

RODOL

FLETCHER MILLER LTD., ALMA MILLS, HYDE, CHESHIRE.

Telephone: HYDE 3471 (5 LINES)

Telegrams: EMULSION, HYDE

Also at LONDON, WEST BROMWICH, NEWCASTLE-ON-TYNE, CARDIFF, GLASGOW AND BELFAST

R.35

When answering advertisements kindly mention MACHINERY.

THOMSON

for Gears of all Types



J. THOMSON & SON (GEARS) LTD

SWAN GEAR WORKS : NEW ADDINGTON : CROYDON

Telephone: LODGE HILL 3125

The New ABC Filing and Sawing Machine

Table 12in. by 10in.
Tilting
Throat 8in.
Stroke 3in.
Weight 120 lbs.
approx.
Motorised



Irregular shapes cut and filed in steel or metal to precision finish

A. B. CREED LIMITED,
Machine Tool Makers
LITTLE ILFORD LANE, LONDON, E.12 - Tel: ILFord 0455

SMP *PRECISION Engineers*

A.I.D.
D.I. Arm
A.R.B.
Approved

Capstan auto and centre lathe turning
Horizontal and vertical milling
Drilling and tapping
Centreless surface and internal grinding
Case-hardening and stove enamelling
Own Design and Drawing Office,
Toolroom and Experimental Department
Machining specialists in stainless and various high tensile steels

SCREW MACHINE PRODUCTS LTD
Wooburn Green - Near High Wycombe - Bucks
Telephone: BOURNE END 111

BIRFIELD



TOOLS LTD

**capacity available
IMMEDIATELY!**

Reconditioning of Machine Tools up to Ten Tons...

Recent extensions to our factory premises enable us to offer prompt and completely dependable attention to worn machine tools of all descriptions. We are fully conversant with and experienced in the repair of machines intended for heavy duty production, as well as with specialised machinery operating to limits of the highest accuracy

BIRFIELD TOOLS LTD

BODMIN ROAD · COVENTRY



Walsgrave-on-Sowe 2372 for
our representative to call

When answering advertisements kindly mention MACHINERY.

WE HAVE THE 'MEASURE' OF Porosity

Porosity in metal has always been a problem, but to-day its effects can be extremely serious especially in castings used in Aircraft, Electronic and Nuclear equipment. A casting containing microporosity, is not necessarily structurally unsound, and impregnation of the casting by the latest resins can render it "as new". Even a casting that has had many hours of machining time spent on it before the effects of porosity are noted, can be reclaimed—and what is so vital, the fine tolerances are completely unaffected by impregnation. The process is inexpensive and there is no limit to the size of casting that can be treated. For castings used in equipment where safety is of prime importance, they can be impregnated thereby ensuring that they are perfect and entirely safe from porosity. Such impregnation is demanded for certain Nuclear and Electronic equipment. Please write for full details or let us send one of our experienced engineers to your Works.

Approved by Admiralty, M.O.S., A.I.D., A.R.B.

INDUSTRIAL IMPREGNATIONS LTD.

THE LARGEST IMPREGNATING ENGINEERS IN EUROPE

HEAD OFFICE & FACTORY:

9, WILLOW ROAD, POYLE ESTATE, COLNBROOK, Bucks.

Telephone: Colnbrook 2086/7

BIRMINGHAM

14-16 Port Hope Road,
Sparkbrook, Birmingham, 11.
Telephone: Victoria 5312.

OLDHAM

45, Roscoe Street,
Telephone: Main 5350.

OVERSEAS:

Impregnaciones Industriales S.A.
Madrid & Barcelona.



B L B

BRITISH LAMINATED BRASS

Peels IN 2 or 3 THOU
LAMINATIONS

FOR SIMPLE
ACCURATE
EFFICIENT
SHIMMING

BRITISH LAMINATED BRASS CO. LTD
SLOUGH, BUCKS.
European Distributors for Sheet (excluding the British Isles)
BENJAMIN WHITTAKER LIMITED
VICTORIA HOUSE, VERNON PLACE, SOUTHAMPTON ROW, LONDON, W.1

RAYNER POWER DRIVES



"3 H.P."
12 to 60 r.p.m.

*Infinitely
Variable*



"3/4 H.P."
3 to 16 r.p.m.

Compact purpose-made
Power Drives are our business

PETER RAYNER LTD RAYNER
121 WHITEHALL RD • LEEDS 12 TELEPHONE: LEEDS 33844

When answering advertisements kindly mention MACHINERY.



Photograph by kind permission of the Austin Motor Co. Ltd.

'Capacity Plus'

The versatile AUSTIN 'GIPSY' with its rugged yet attractive appearance and all round capabilities is a 'natural' in surroundings like these. Its flexible performance is one in which the high capacity, low friction and space saving characteristics of TORRINGTON Needle Bearings

have been proved to advantage.

TORRINGTON Bearings are 'naturals' in the main gearbox, transfer box and differential wheel drive of this exciting vehicle.

Like the 'GIPSY'—TORRINGTON Bearings rate high as an engineering product.

Write to our Bearings Division for details and engineering service.

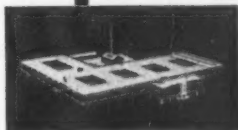
Torrington Needle Bearings give you these benefits

- * Compactness and light weight
- * unequalled radial load capacity
- * low starting and running friction
- * low unit cost
- * run on hardened shafts
- * allow larger and stiffer shafts

MADE AND STOCKED AT OUR
ENGLISH FACTORY

TORRINGTON BEARINGS

The Torrington Company Ltd, Bearings Division, Torrington Avenue, Coventry.
London and Export Office: 7-10 Eldon Street, E.C.2. Glasgow Office: 14 Moir Street, C.I.





The heavier the load
the tighter the grip!

BULLDOG UNIVERSAL PLATE CLAMP

MADE IN DENMARK

Made of Electro Steel, automatically adjustable and self-stretching. The moveable strap grips and holds at any angle. Crane models take plates from $\frac{3}{4}$ in. to 10in. thick, in five sizes to lift from 1 to 10 tons, and tested to 100 per cent. overload. Official test certificate issued.

Two Hand models available for plates up to $\frac{3}{4}$ in. thick and 3 cwt. capacity. Tested to 480 lbs.

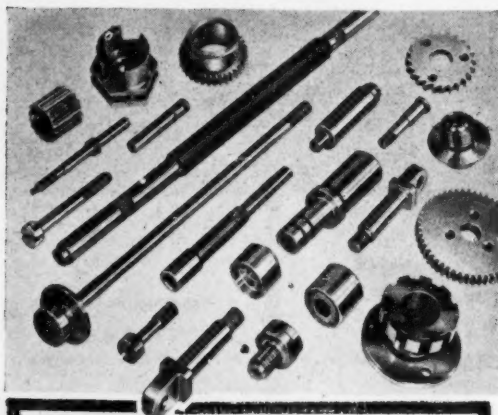
NORMAL DELIVERY EX LONDON STOCK
DISTRIBUTORS AND STOCKISTS FOR THE UNITED KINGDOM



MORTIMER
ENGINEERING CO.
RUGBY, ENGLAND & GUILDFORD, SURREY



Sales Office: 204-6 Acton Lane, Harlesden, London, N.W.10. Tel. ELG 3834



**Quality
turned
parts**

- ★ All Materials—★ 50-5000 Quantities a speciality
- Stainless & High Tensile Steel, Nylon, Tufnol, etc.
- ★ Small Gears—★ All enquiries promptly handled
- Spurs, Sprockets, Ratchets, Bevels, etc.
- ★ Grinding, Heat Treatment, Plating. ★ A.I.D. approved, On M.O.S. Lists.

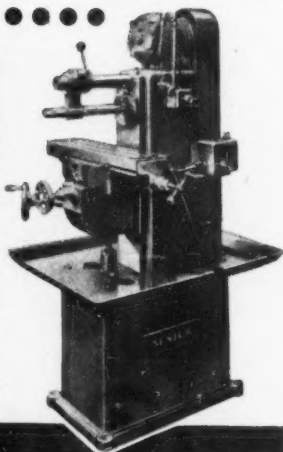
S.M.E.C. LIMITED 
STEYNING • SUSSEX • ENGLAND Phone STEYNING 2228

When answering advertisements kindly mention MACHINERY.

OUTSTANDING IN VALUE AND PERFORMANCE

Table - 25in. by 6in.
Table travel - 15in.
Cross feed - 5jin.
Vertical feed - 11in.
12 spindle speeds from 50 to 1,660 r.p.m. Full range of accessories can be offered.

PRICE including stand and motor, Brook Push-button starter, suds pump and cutter arbor £316



'SENIOR' MODEL MI. MILLING MACHINE

- For full particulars write to manufacturers
- T. SENIOR, ATLAS WORKS, LIVERSEDGE, YORKS.


REMEMBER!

TAL

for

**PRESSURE
DIECASTINGS**

ZINC B.S. 1004 OR ALUMIN
LARGE OR SMALL



Enquiries to

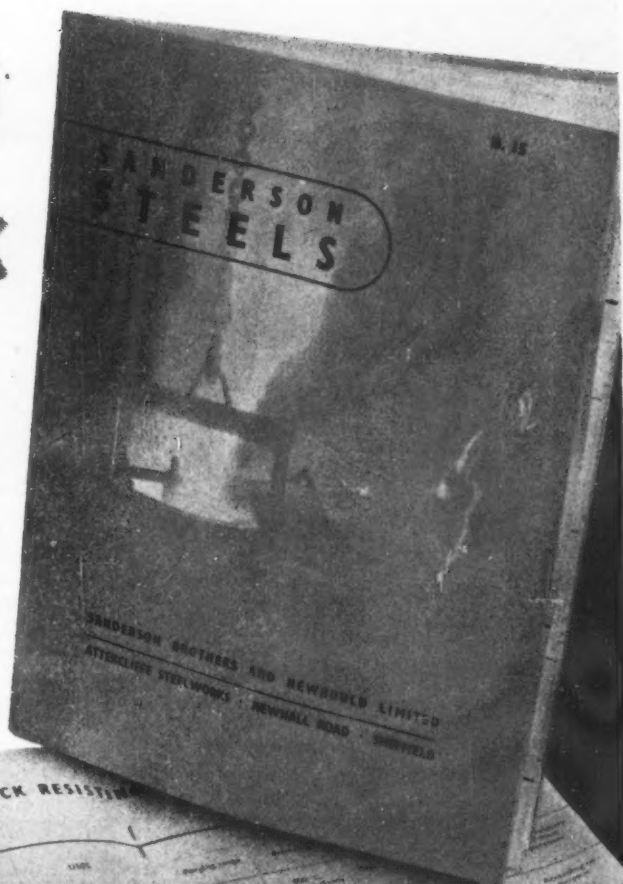
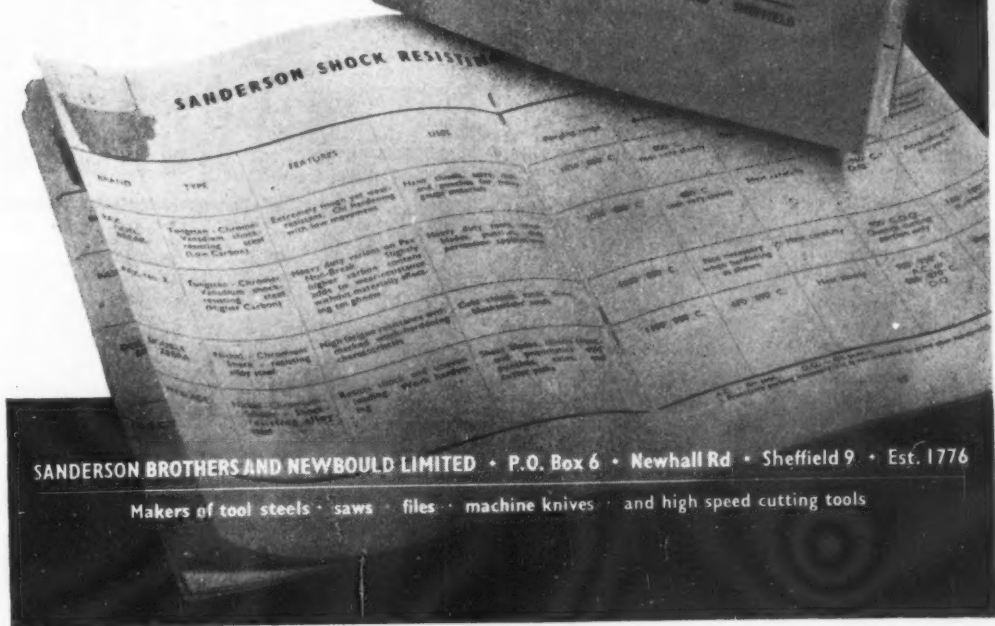
T.A.L. DEVELOPMENTS LTD.

BROADWATER WORKS, GARMAN ROAD, TOTTENHAM, N.17
TELEPHONE: TOTTENHAM 2732/3

Useful little book

... for the steel buyer,
the tool room manager,
the production engineer —
in fact anyone who has
to use or order tool and
high speed steels.
"Sanderson Steels"
describes our standard
range and illustrates
typical applications.

Write for a copy

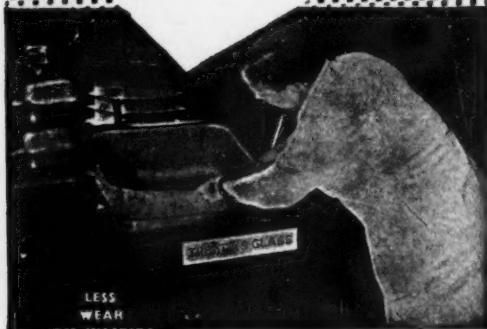
GRADE	TYPE	FEATURES	USES
SAF 1	Tool Steels	Extremely tough and wear resistant. All hardening with low distortion.	Heavy duty tools, dies, punches, and moulds for mass production.
SAF 2	Tool Steels	Heavy duty tool steels. High toughness. High resistance to wear. High resistance to impact.	Heavy duty tools, dies, punches, and moulds for mass production.
SAF 3	Tool Steels	Heavy duty tool steels. High toughness. High resistance to wear. High resistance to impact.	Heavy duty tools, dies, punches, and moulds for mass production.
SAF 4	Tool Steels	Heavy duty tool steels. High toughness. High resistance to wear. High resistance to impact.	Heavy duty tools, dies, punches, and moulds for mass production.
SAF 5	Tool Steels	Heavy duty tool steels. High toughness. High resistance to wear. High resistance to impact.	Heavy duty tools, dies, punches, and moulds for mass production.
SAF 6	Tool Steels	Heavy duty tool steels. High toughness. High resistance to wear. High resistance to impact.	Heavy duty tools, dies, punches, and moulds for mass production.
SAF 7	Tool Steels	Heavy duty tool steels. High toughness. High resistance to wear. High resistance to impact.	Heavy duty tools, dies, punches, and moulds for mass production.
SAF 8	Tool Steels	Heavy duty tool steels. High toughness. High resistance to wear. High resistance to impact.	Heavy duty tools, dies, punches, and moulds for mass production.
SAF 9	Tool Steels	Heavy duty tool steels. High toughness. High resistance to wear. High resistance to impact.	Heavy duty tools, dies, punches, and moulds for mass production.
SAF 10	Tool Steels	Heavy duty tool steels. High toughness. High resistance to wear. High resistance to impact.	Heavy duty tools, dies, punches, and moulds for mass production.

SANDERSON BROTHERS AND NEWBOULD LIMITED • P.O. Box 6 • Newhall Rd • Sheffield 9 • Est. 1776

Makers of tool steels • saws • files • machine knives • and high speed cutting tools

When answering advertisements kindly mention MACHINERY.

**THIS
NARITE
DIE PRODUCED, AT
THE RATE OF
1,500
PER DAY,
OVER
250,000
STAINLESS STEEL
SINKS**



LESS
WEAR
LESS WASTERS
MORE
PRODUCTION
MORE
PROFIT

Photo by courtesy of
Messrs. Wallis & Co. (Long Eaton) Ltd.

Universally accepted as the greatest
advance ever made in die metal technique.
Ask for revised brochure, giving full
details and latest technical information.

NARITE

The METAL FOR PRESS TOOLS

N. C. ASHTON LTD
ST. ANDREW'S ROAD, HUDDERSFIELD ENGLAND

TELEPHONE: HUDDERSFIELD 4263/4

CW 3296

MARLCO ALL-PURPOSE COLLET CHUCK



★
WITH STANDARD
BROWN & SHARPE OR
MORSE TAPERS

★
REMOVABLE TANG
PERMITS DRAW-BOLT
OPERATION

★
DESIGNED TO
PREVENT MOVE-
MENT OF WORK-
PIECE, ENDMILL,
ETC.

★
ADJUSTABLE STOP
REMOVED FOR
BAR WORK.

★
EX STOCK

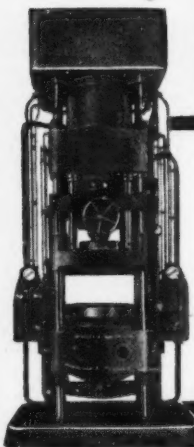
COLLET CAPACITY 1/16in. to 3/4in. x 1/32in. dia.
SPECIALS ON REQUEST.

W. H. MARLEY & CO. LIMITED
NEW SOUTHGATE WORKS, 105 HIGH RD., LONDON, N.11

TELEPHONE: ENTERprise 5234-5578

DOUBLE ACTION
HYDRAULIC

DRAWING PRESSES



TWO STANDARD SIZES ARE
AVAILABLE:

No. 715 (70 tons max. load) and
No. 765 (150 tons max. load).
Double or single action working.
Especially suitable for deep draw,
e.g., the larger machine can draw
a 30in. diameter steel blank 1in.
thick, to a depth of 10in. in one
operation.

Operation either manual, automatic
single cycle or continuous cycles.
Hydraulic system self-contained and
completely sealed.

You are invited to send for further
information.

Bradley & Turton Ltd

CALDWALL WORKS KIDDERMINSTER
PHONE 2217/8

When answering advertisements kindly mention MACHINERY.

a new Tecalemit team for inexpensive, metered lubrication

- * The MINOR hand-operated pump
- * The SINGLE-LINE grease injector

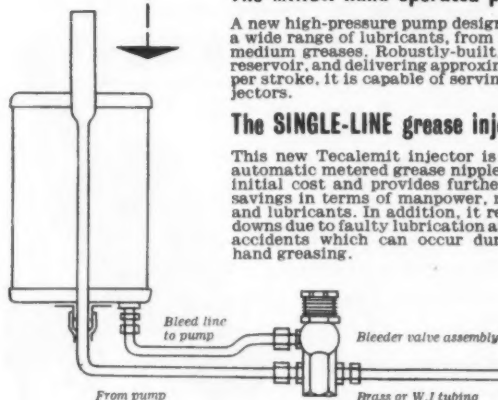
For consistently dependable, metered lubrication, these two new pieces of Tecalemit-engineered equipment make a perfectly matched team. Sturdily-designed and simply maintained, the MINOR pump will handle a wide range of lubricants whilst the SINGLE-LINE grease injector ensures positive barrel-to-bearing lubrication with up to 50% saving in grease.

The MINOR hand-operated pump

A new high-pressure pump designed to handle a wide range of lubricants, from heavy oils to medium greases. Robustly-built, with a 3 lb. reservoir, and delivering approximately 0.6 c.c. per stroke, it is capable of serving up to 24 injectors.

The SINGLE-LINE grease injector

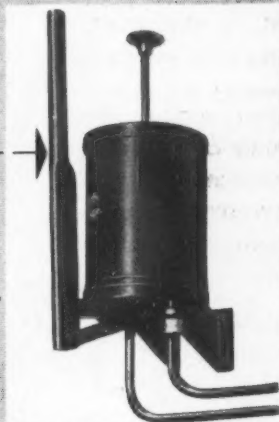
This new Tecalemit injector is virtually an automatic metered grease nipple. It has a low initial cost and provides further substantial savings in terms of manpower, running costs and lubricants. In addition, it reduces break-downs due to faulty lubrication and eliminates accidents which can occur during frequent hand greasing.



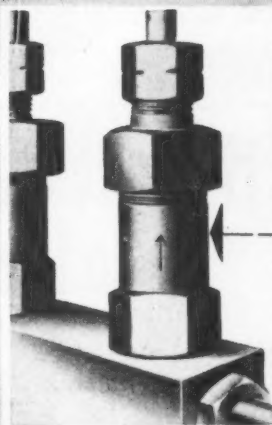
TECALEMIT
The Authority on Lubrication

TECALEMIT (Sales Mv) PLYMOUTH DEVON

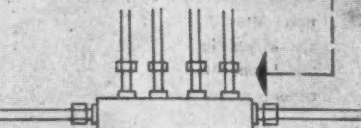
FULL DETAILS AND TECHNICAL
INFORMATION FREELY AVAILABLE



The MINOR hand-operated pump



The SINGLE-LINE grease injector



- THE MINOR PUMP WILL WORK IN CONJUNCTION WITH ANY SYSTEM
- THE SINGLE-LINE GREASE INJECTOR CAN ALSO BE OPERATED WITH SEMI-AUTOMATIC, FULLY-AUTOMATIC AND INTERMITTENT AUTOMATIC SYSTEMS

T657B

When answering advertisements kindly mention MACHINERY.

MARLOW

Mk. IV VERTICAL MILLING MACHINE

- ▶ SWIVELLING AND DOWN FEED HEAD
- ▶ LARGE CAPACITY
- ▶ TABLE 28" x 8"
- ▶ 6 SPEEDS 85 to 1450 r.p.m.
- ▶ SPINDLE TO TABLE 20"
- ▶ HEIGHT 80"

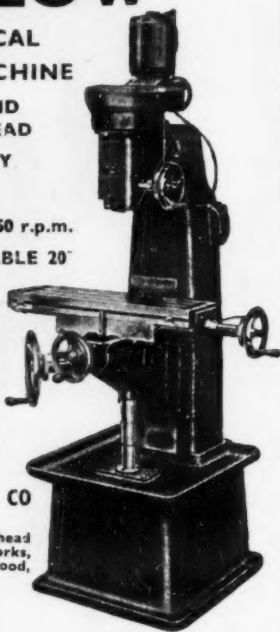
MARLOW Models

- MK IV (Illustr.) £285
 MK I 22" x 6" £193
 MK II 28" x 6" £210
 MK III 29" x 8" £225

VICTA ENGINEERING CO

Offices:
 Thicket Corner, Maidenhead
 Tel 59 and at: Eagle Works,
 Chester Rd. Boreham Wood,
 Herts.

Tel: Elstree 3146



Fit the thread to the job!

Makes soft threads hard
 Gives new threads for old

Made in high carbon
 steel for use in
 aluminium and
 magnesium . .
 also in stainless
 and bronze for
 other applications



Details and samples on request—
CROSS MANUFACTURING CO. (1938)
 Ltd.

BATH, SOMERSET. Tel. Combe
 Down 2355-8
 Grams: Circle BATH

SPECIALISTS IN THE MANUFACTURE
 OF JET ENGINE LABY-
 RINTHS, CIRCLIPS, SPRING
 WASHERS, SPRINGS, ETC.

CROSS
THE BRITISH
WIRE THREAD
INSERTS

When answering advertisements kindly mention MACHINERY.

LINK-V



FASTENER

is suitable for
 ROLLS OF SOLID CONSTRUCTION V-BELTING

Patent No. 749362 and others

- ★ M. A. B. C. P & D sections available.
- ★ BELTING supplied in 50ft. and 150ft. rolls.
- ★ QUICKLY FIXED. Any size of belt made up in a few minutes
- ★ EASILY DETACHABLE. Belt can be shortened and fastener used again.
- ★ STRONG JOINT. Indefinite life of joint by replacing oil impregnated bronze bushes.

Write for
 fully descrip-
 tive leaflet.

FLEXICON LTD.

NORTH WING MILLS · BRADFORD · YORKS
 PHONE: 23941

GNG TAPPING ATTACHMENT

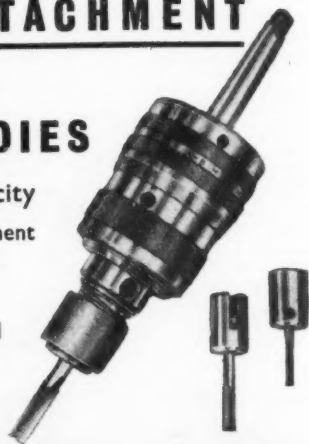
for

TAPS & DIES

1/16"—1/2" Capacity
 Graduated Adjustment
 for Friction Clutch
 Drive.

Automatic Reversal
 at Double Speed.

Quick-change
 Chuck.



MORTIMER ENGINEERING
 PROPRIETORS COMPANY



Sales Office: 204-6 Acton Lane, Harlesden, London, N.W.10. Tel. ELG 3834

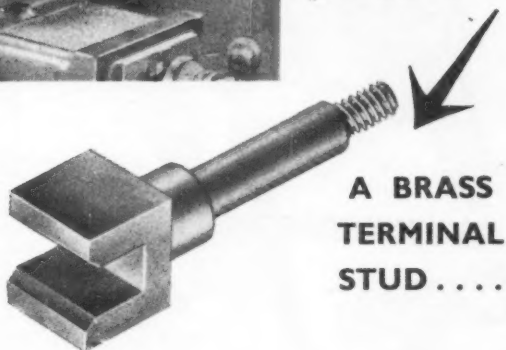
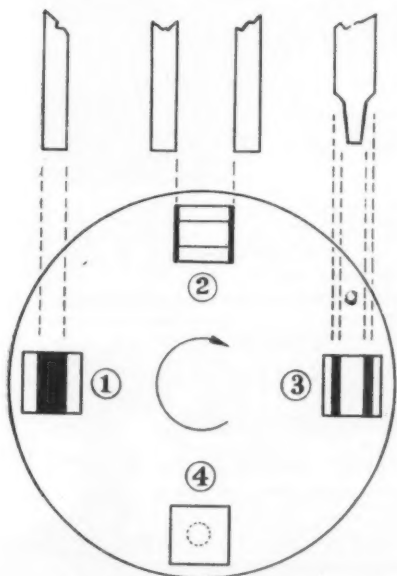


By courtesy of Belling & Lee Ltd. Enfield.

A

CENTEC 2B**MILLING MACHINE**

equipped with a

4 station index table produces★ **HOW IT IS DONE****A BRASS
TERMINAL
STUD****in 3 consecutive
milling operations simultaneously****1st OPERATION**

1. Rough mill slot

2nd OPERATION

2. Straddle mill

3rd OPERATION

3. Finish mill slot and chamfer sides

4. Loading station

Automatic indexing 90°. Hand lever control. Manual loading

CENTEC MACHINE TOOLS LTD. CENTEC WORKS, HEMEL HEMPSTEAD, HERTS.**Boxmoor 584-5-6**

Whatever the TOOL LINDLEY'S have it



Comprehensive stocks
of machines, tools
and accessories.

Main stockist and distrib-
utors for Black & Decker,
Wolf, and Bridges Electrical
Equipment.

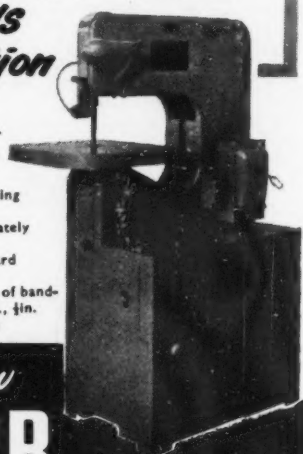
C. LINDLEY & CO. LTD.
ENGLEFIELD RD., LONDON, N.I.

Phone : CLissold 0643 (5 lines)

Grams : BEAUVOIR NORDO, LONDON

CONTINUOUS FILING *speeds production*

Size of table 20in. by 20in.
Depth of throat 18in.
Cutting speed 5 steps
Range 9 to 44 m/min
Smallest hole for introducing
the file chain $\frac{1}{16}$ in.
Power required approximately
0.75 H.P. 220/380 Volts
Table inclinable 20° forward
15° back
Three widths and sections of band-
file may be used $\frac{1}{16}$ in., $\frac{1}{8}$ in., $\frac{1}{4}$ in.
rough medium or fine cut



The new
GROB

(MODEL F.A.B. 18)

BAND FILING MACHINE

FISHER DEANE ENGINEERING CO LTD

19 HOWARD CLOSE, HAMPTON, MIDDX. Tel. MOlesey 2612

HARRIS

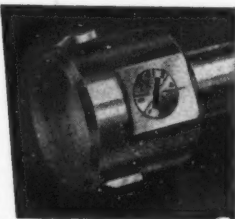
PATENT

FLOATING REAMERS

- Micrometer adjustment to 0.0005 in.
- Variable float unaffected by adjustment
- Maximum support for cutters
- Rigid positive locking

8 Sizes for holes
from 1in. to 4 $\frac{1}{2}$ in. dia.
Ask for fully
descriptive leaflet

F. & T. KITCHIN VICKERSDALE WORKS
STANNINGLEY, PUDSEY, YORKSHIRE



"COVENTRY"

WET TOOL GRINDER

Specially designed for tungsten carbide tools, one wheel for roughing and one for finishing. Large diameter ball-bearing spindle. Sturdy construction throughout, with self-contained motor drive as shown. Write for full details.

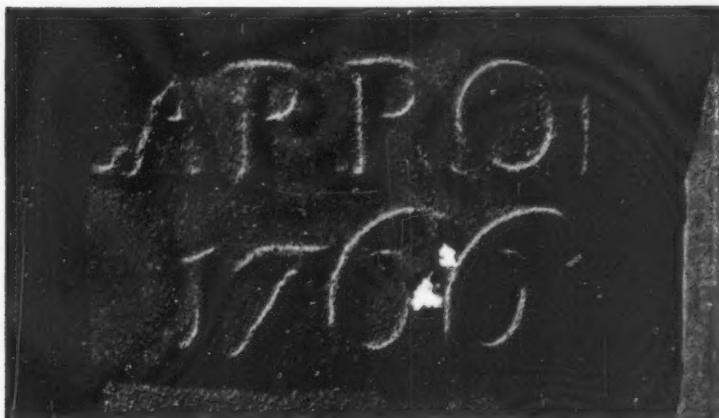
CENTAUR TOOL WORKS

BYRE ST., SPRINGHILL, BIRMINGHAM

Phone (021) 428 1111/3. Grams CAPTAIN BIRMINGHAM



When answering advertisements kindly mention MACHINERY.



Castings for James Watt



Famous names in engineering have long discussed their manufacturing problems with Carron Company. Illustrated above is a portion of the first complete set of castings for James Watt's steam engine (which

made possible the development of the steam locomotive) made at Carron Company's Works in 1766. The Company have ever been eager to experiment and help in the development of new ideas.



1958 ...*castings for the world!*

To-day, Carron Company covers over 200 acres. Here are light and heavy foundries, forging shops, machine shops, fabrication shops and enamelling plant. As alert to new trends and techniques in this year as they were almost 200 years ago, Carron Company has a reputation for quality which the most astute manufacturer accepts without question. Consultations are welcome any time.



CARRON COMPANY • CARRON • FALKIRK • STIRLINGSHIRE

Showrooms and Sub-offices: 15 Upper Thames Street, London, E.C.4. 22-26 Redcross Street, Liverpool, 1. 125 Buchanan Street, Glasgow, C.1. Sub-Office: 33 Bath Lane, Newcastle upon Tyne.

44A

When answering advertisements kindly mention MACHINERY.

Precision Castings for every Industry



PRESSURE DIE CAST
in
High Tensile
Zinc

GRAVITY DIE CAST
in aluminium

AB OF

THE ALUMINIUM BRASS & DIECASTING FOUNDRY LTD

14-15 GASKIN STREET · ISLINGTON
LONDON · N1 Phone CANONBURY 7141/2



W TYPE SINGLE

ESSEX

UNIVERSAL JOINTS

B TYPE DOUBLE

Manufactured in 14 standard sizes.
Shaft diameters
 $\frac{1}{4}$ in. - 2 in.

THE MOTOR GEAR & ENGINEERING CO. LTD.

ESSEX & CORONA WORKS · CHADWELL HEATH · ESSEX · Phone Seven Kears 3456-7745 (10 Lines)

These PARALLEL ACTION Pliers are FIRM FAVOURITES with all TRADESMEN



MAUN INDUSTRIES LIMITED MANSFIELD, NOTTS.

S&B

Special Purpose Machines

We now have facilities for designing and manufacturing Special Purpose Machines from our standard lathes. Air, Hydraulic or Mechanical Operation.

SMART & BROWN (Machine Tools) LTD.
25, MANCHESTER SQUARE, LONDON, W.1.
Telephone: WELbeck 7941/6

SOCKET HEAD SCREWS

PROMPT DELIVERY OF ALL STANDARD SIZES
SEND FOR LIST Telephone: LEYLAND 81202

OLIVERS SOCKET SCREWS LIMITED,

MOUNT PLEASANT · LEYLAND · LANCASHIRE



MACHINERY'S ELECTRICAL BOOKS

MACHINERY'S HANDBOOK

(Latest Edition—Thumb-Indexed)

Presents in one complete volume all the essential data for the entire field of shop practice and machine tool design. Amply illustrated by diagrams accompanied by proven data, the latest printing of this world-famous book gives not only all the old, tried and proved features of earlier editions but, in addition, the most useful, recent and complete collection of data, standards, formulae and practical information.

Price 72s. cash and C.O.D. Instalments 80s., payable 13s. 4d. in 10 days 13s. 4d. monthly. Overseas, cash with order, plus 3s. postage.

FACTORY ELECTRIFICATION

A complete guide to the subject, it includes practical information on switch gear, transformers, cables and wiring systems, motor control gear and the various types of motor such as induction and A.C. commutator motors, D.C. and synchronous motors. Information is given on power-factor improvement and the application of electric motors. Fully illustrated and clearly written.

Price 35s. cash and C.O.D. Instalments 38s. 6d., payable 8s. 6d. in 10 days 7s. 6d. monthly. Overseas, cash with order, plus 2s. 6d. postage.

PRINCIPLES OF ELECTRONICS—L. T. Agger

Comprehensive introduction or both the practising engineer and student. Begins with detailed discussions on electron dynamics, thermionic emission, conduction through gases, and rectification; and continues with descriptions of the various electronic devices, including diodes, triodes, multi-electrode valves, gas-filled valves and cathode ray tubes. Also discusses amplification tuning, oscillators, modulation and demodulation, and photo-electricity. Employs a simple mathematical approach with fully descriptive diagrams, and contains many worked-out examples.

Price 20s. cash and C.O.D. Instalments 22s., payable 7s. in 10 days, 7s. 6d. monthly. Overseas, cash with order, plus 2s. 6d. postage.

INDUSTRIAL ELECTRICAL PLANT MAINTENANCE

—E. G. Annes

Mainly devoted to motors and their associated control and protective gear. No theory or design, but wholly maintenance and overhaul.

Price 27s. 6d. cash and C.O.D. Instalments 30s., payable 6s. in 10 days, 6s. monthly. Overseas, cash with order, plus 2s. postage.

INDUCTION HEATING—(Fundamental Principles and Practice)—"Heat Treater"

A good introduction to the subject describing its application to hardening, brazing, soldering, annealing, stress relieving and paint drying.

Price 12s. 6d. cash and C.O.D. Instalments 13s. 9d., payable 7s. in 10 days, 6s. 9d. monthly. Overseas, cash with order, plus 2s. postage.

FREE APPROVAL NO DEPOSIT INSTALMENTS

To MACHINERY, National House, 21 West Street, Brighton, I.
Please send me books marked X above
For CASH herewith or by C.O.D. or
ON APPROVAL, when I will either return in 5 days, or
pay FULL CASH, or by INSTALMENTS as stated above.

Name Position

Address Firm.....

Write for Book Catalogue and details of Instalment Terms.

When answering advertisements kindly mention MACHINERY.

METALECTRIC

for factory, foundry, or toolroom

METALECTRIC FURNACES LIMITED

SMETHWICK · ENGLAND

8/15/58

WHO SAID
REPETITION GREY
IRON CASTINGS?

From
1 oz to 1 cwt

When the call is for Grey Iron Castings, Henley Foundries can answer it . . . Swiftly, Economically

- Good Machining Properties
- High Dimensional Accuracy
- First-Class Finish and Appearance
- Repetition Work a Speciality

HENLEY FOUNDRIES

All enquiries to: HENLEY FOUNDRIES LTD., BANNER'S LANE, CRADLEY, CRADLEY HEATH, STAFFS. PHONE: CRADLEY HEATH 66901

STEEL FABRICATION SPECIALISTS

—GUILLOTINING—ROLLING—
—PROFILING—WELDING—
—MACHINING—

C.F. IDE
ENGINEERING LTD.

EMPIRE WORKS, 163 CLARENCE STREET,
KINGSTON-ON-THAMES

Telephone: KINGSTON 6820



TEE NUTS
AND
TEE BOLTS

MADE IN VARIOUS
STANDARD SIZES
AND USED ON
MANY HIGH-CLASS
MACHINE TOOLS.

Good Deliveries.

SIMILEX

MANUFACTURING CO. LTD.
Winton Works, Wharf St.,
Sowerby Bridge.
Telephone: HALIFAX 81928



When answering advertisements kindly mention MACHINERY.

could you use the skill of 100 engineers?

Rotheroe & Mitchell Ltd., have expert facilities for the development, design, tooling and testing of all types of equipment, including electronic apparatus.

If you are having difficulty in meeting delivery promises, why not take advantage of our service, after all sub-contracting has been our business for 21 years.

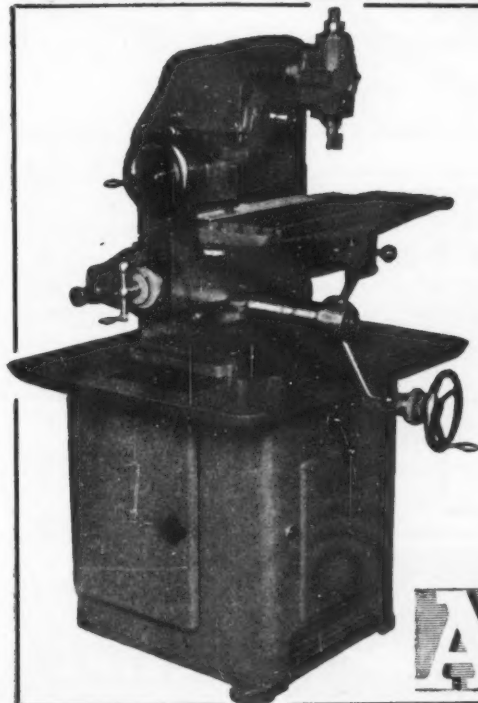
Write or telephone for further details today.

There is no reason why you shouldn't. That is the experience and skill you have at your service when you contact Rotheroe & Mitchell Ltd., and that is a very sound move if you are concerned with the making of precision components from bar or castings, or the manufacture and assembly of complete equipments in the Instrument and Electro-Mechanical field.

ROTHEROE & MITCHELL LTD

Electrical and Mechanical
Instrument Makers

Aintree Road, Perivale, Middlesex Tel: PERivale 2238-4



SWISS **ACIERA** MADE

UNIVERSAL MILLING MACHINE TYPE F.3.

- ★ Horizontal and Vertical Milling
- ★ Plain or Universal Tables 23in. by 7in.
- ★ 8 Spindle Speeds 155—2,500 r.p.m.
- ★ Inclined Vertical Head
- ★ Inclined Slotting Head
- ★ Ground Feed-Screws
- ★ Punch and Die Milling Equipment
- ★ Hand and Power Traverse
- ★ Foot Pedal Controls

Delivery: 8 weeks or better

Adam machine
equipment
limited

4 GRANGE STREET
ST. ALBANS, HERTS

Telephones:
St. Albans 56731/2
Telegrams:
Amelco, St. Albans

When answering advertisements kindly mention MACHINERY.

You can cut SPUR AND BEVEL GEARS on your shaping machine

with

MATTERSON

Gear Cutting Attachments



Bevel
Gear
attachment

With these two simple attachments—one for spurs and the other for bevels—you can cut gears up to 12" diameter, 4 DP. Easily fitted to any make of shaping machine. The spur gear attachment can also be used on your milling machine as an efficient dividing head.

EARLY DELIVERY



Spur Gear
attachment

Write for illustrated Catalogues.



DOWDING & DOLL LTD

346 KENSINGTON HIGH STREET, LONDON, W.14

Telephone WESTERN 8077 (8 lines)

Telegram ACCURATool HAMMER LONDON

163

contact

MAHERS

FOR HIGHEST PRICES...

when disposing of your surplus stocks of:

HIGH SPEED & ALLOY STEEL BARS

ALSO

TUNGSTEN MOLYBDENUM

NICKEL TITANIUM

COBALT

SCRAPS & RESIDUES

J. W. MAHER & SON LTD.

Scrap Dept., Edward St., Sheffield 3, England

Phone: Sheffield 27976

Cables: Jomah, Sheffield

TAPER PIN REAMERS

PROMPT
DELIVERY OF
ALL SIZES

TEL:
STAFFORD
304



J. H. LINES LTD. 46 Stone Road, Stafford

"SPYK" LETTERS FOR REGD. TRADE MARK FOUNDRY PATTERNS



ALSO
TRADE MARKS.
MONOGRAMS.
DOWELS.
FILLETS.
RAPPING
PLATES.

MADE BY

J. W. & C. J. PHILLIPS LTD.
POMEROY STREET., LONDON, S.E.14.

OUR ENGRAVING DEPT.
IS ALSO AT YOUR
SERVICE

Anderton



TYPE
1300



TYPE
1400



TYPE
1500

Write for DATA SHEETS
to Dept A.4
ANDERTON SPRINGS LTD.,
BINGLEY
Tel: Bingley 2380, 2351, 2226
Grams: 'CIRCLIPS' - BINGLEY

CIRCLIPS

A.I.D., A.R.B., I.F.V. approved

When answering advertisements kindly mention MACHINERY.

CLASSIFIED ADVERTISEMENTS

RATES : PLAIN ADVERTISEMENTS Except "Situations Wanted" (ALL TYPE) : 2/2 per line. MINIMUM 8/8 (4 lines) OR £1 8s. 2d. per inch (13 lines per inch). Box Nos. 1/3 extra per insertion. SITUATIONS WANTED : 1/8 per line. MINIMUM 6/8 plus 1/3 Box No. SPECIAL DISPLAY TYPE (with or without Blocks) : ★ p. £1 10s.; ☆ p. £3; † p. £6 or £2 per inch (min. 3in.). Series rates on request.

CONTRACT WORK


••• DESIGNS •••

PRECISION PRODUCTS
(ROMFORD) LTD.

TOOL DESIGNERS
AND MANUFACTURERS

For all your needs

IN
JIGS · FIXTURES
GAUGES · PRESS TOOLS
FORM TOOLS AND
SPECIAL MACHINES



Viking Works, London Rd.,
Romford, Essex. Tel : Romford 61991/2

PRODUCTION

EQUIPMENT

DESIGN

CONSULTANTS

In all directions

DESIGNEX
(COVENTRY) LTD.

can help

Phone 64049

PRESS TOOLS
LAMINATIONS—COMBINATION—PROGRESSION, ETC.

**JIGS—FIXTURES—PROTOTYPE and
PRE-PRODUCTION MACHINING**

Designing—Short Order Work—Sub Assemblies Completely Toolled

JIG BORING AND PRECISION GRINDING
LANDEN (ENGINEERS) LTD.

1a, Aubert Park, Highbury, London, N.5
Phone : CANonbury 1075

 ESTD 1889

R-STEPHENS & SON LTD

PRESS TOOLS · JIGS
FIXTURES · MOULDS
GAUGES · DESIGNS

115 CHURCH ROAD
UPPER NORWOOD
LONDON S.E.18

PHONE
LIVINGSTONE
2265-6

WE DESIGN
AND MANUFACTURE
PRESS TOOLS
AND DO THE
PRESS WORK

A.I.D. & A.R.B. APPROVED

NAISH BROS. & CO. LTD.
124, CHELTENHAM ROAD,
BRISTOL. Tel.: 25532-3



design & production HEADACHE? —take 'ABBEY' ASPIRIN

Let us relieve you of that 'headache' by our rapid and competitive design and manufacturing services. We specialise in transfer and special purpose machines, auto tooling, jigs and fixtures, press tools, plant layout and factory services.

Members of the Federation of Engineering & Design Consultants

Consultants in all departments of engineering

THE ABBEY TOOL CO. LTD. CHURCH HILL · COLESHILL · BIRMINGHAM
Tel.: COLESHILL 3276
109 FISHERGATE, PRESTON, LANCs. Tel.: PRESTON 2309

Press Tools, Press Work, Jigs,
Fixtures, Capstan and Auto. Turning
Special H.S. Cutters. Components manufactured
and assembled to spec.—L. PERSON & SON,
63, Shaftesbury Street, N.1. CLE. 7130.

Presswork Up to 50 Tons, In-
cluding deep-drawing. Long or short runs.
Customers' tools and materials acceptable.
Tooling and designing.—BIRCH & JACQUES
(TOOLMAKERS), LTD., Hershham Trading
Estate, Walton-on-Thames. Tel.: W-on-T 5370.

● ENGINEERING BUYERS NEED MACHINERY'S ANNUAL BUYERS' GUIDE

When answering advertisements kindly mention **MACHINERY**.

Classified Advertisements (CONTRACT WORK, contd.)



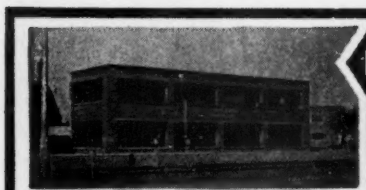
TOOL DESIGNERS & MANUFACTURERS

JIGS, FIXTURES,
PRESS TOOLS, SPECIAL
PURPOSE MACHINES
JIG BORING & PROTOTYPE
WORK

TARGET ENGINEERING LTD.

NORTHFIELD ROAD, COVENTRY

Telephone: Coventry 22256 and 22080



W.R. SOUTHWELL (DESIGNS) LTD
30 ST. DUNSTONS HILL, CHEAM
SURREY • Phone: FAIRLANDS 3617 E 7548

DESIGN & PLANNING

PRESS TOOLS
JIGS & FIXTURES
SPECIAL PURPOSE M/Cs
DIECASTING MOULDS
PLASTIC MOULDS
PIPING, DUCTING, ETC

Export Enquiries Invited

GEARS

GEARS We are Specialists

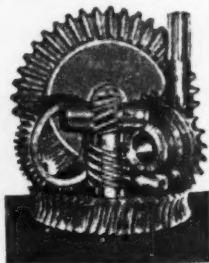
Experienced Gear cutters at your service
No need to let a gear problem stump you
Expert knowledge is on hand
Rapid delivery from customers' own blanks
All gears cut, or made complete to your requirements
Trust your gear-cutting to us (over 30 years experience)
Every satisfaction assured
Do send your enquiries, large or small, prompt attention given

F. M. ILLICH (GEARS) LTD.

4A JAMESTOWN ROAD, LONDON, N.W.1

Tel: Gulliver 5046

SPIRALS • SPURS WORMS & WHEELS • BEVELS • SPROCKETS
CAPACITY LIST ON APPLICATION



Gear Cutting Super Accurate.

Spurs and Spirals to Admiralty class one specification. Prototype quantities. Very quick delivery.—NEWMONT ENGINEERING COMPANY, LTD., Nodda Works, Julien Road, Ealing, W.5. Phone: EALine 3924.



GEARS

ALL TYPES OF SMALL GEARS

UP TO 8in. DIA. 10 to 64 D.P.

ESTABLISHED IN 1880

G. W. EVERY & SONS, LTD.

49, THORNHILL RD., LONDON, N.1. Phone: NORTH 1827

CAPACITY AVAILABLE FOR DESIGN AND MANUFACTURE OF SPECIAL PURPOSE MACHINES

ALSO
MACHINING CAPACITY ON
CENTRE LATHES, CAPSTANS,
GRINDING, DRILLING & MILLING
MACHINES.

MOORE & ELLIS

(LONDON) 1946 LTD.

61, UNION STREET, BOROUGH, S.E.1

TELEPHONE: HOP 2504

Presswork Up to 40 Tons, Circular and surface grinding on latest J. & S. machines. Tools designed and made for the trade or your article produced throughout in our works. A.I.D. approved. Enquiries welcomed.—WEMBLEY TOOL CO., LTD., 2, Bridge Road, Willenden, N.W.10. WIL. 6667/8.

JIGS
And FIXTURES
Designed & Manufactured by
DINSDALE ENGINEERING CO. LTD
LEEDS PLACE, TOLLINGTON PK. LONDON N.4



**GEARS—PRECISION
AND INSTRUMENT MACHINE CUT**
Max. capacity 12 D.P. 8in. dia
Blanks turned and cut.
SETON CREAGHE ENGINEERING LTD.,
TRADING ESTATE, PARK ROYAL ROAD, N.W.10
A.I.D. Phone ELGar 3356-7 A.R.B.

IMMEDIATE CAPACITY AVAILABLE

- GEAR CUTTING to 24in.
- THREAD MILLING 6in. by 48in.
- PLANING 6ft. by 2ft. 6in.
- BROACHING

MAURALL ENG. CO.
38-40, Upper Clapton Road, E.5
Telephone: AMHerst 6163.

Gears, All Types, Production or replacement, spurs up to 36in. dia. Your Blanks or ours.—SPREADBROUGH ENG'G, LTD., 30 Heath Street, N.W.3. HAM. 8037.

When answering advertisements kindly mention MACHINERY.

Complete production of GEARS

SPURS · SPIRALS · BEVELS
WORMS · WHEELS · RACKS
SPROCKETS & CLUTCHES

Extra rapid delivery
from Customers own Blanks

A.I.D.
APPROVED

COMPLETE
GEARED
ASSEMBLIES

THE DAVALL GEAR COMPANY LTD.

GEARWORKS · HIGH STREET · POTTERS BAR · MIDDLESEX

Telephone POTTERS BAR 23823

GENERAL ENG'G. SERVICES

Immediate Capacity Available,
castings, non-ferrous, die, shell moulded,
sand, etc. Also machining and stove-enamel-
ling.—MILLS ENGINEERING PRODUCTS,
LTD., Barnet. Phone: Barnet 6744.

Induction hardening
and brazing, etc. We collect
and deliver

Shot blasting.

PRECISION HEATING LTD.

142A Canbury Park Road, Kingston-on-Thames
Surrey. Phone: KINGSTON 1468

CROYDON TOOL

AND CASE HARDENING SPECIALISTS EXPERTS IN ALL HEAT TREATMENT OF METALS

CYANIDE HARDENING · ANNEALING · SHOT BLASTING
KEEN PRICES · WE COLLECT AND DELIVER
UNION ROAD, WEST CROYDON. PHONE: THORNTON HEATH 5222

IDEAL HARDENING CO., LTD.

DAVIS ROAD, CHEBBINGTON, SURREY

HEAT TREATMENT
SPECIALISTS
HARDENING OF
EVERY DESCRIPTION
AND SANDBLASTING
Tel.: ELMBRIDGE 6556-6567

IMMEDIATE CAPACITY AVAILABLE

Capstan Work up to 1½ in. Bar
and 6 in. Chucking
Milling, Drilling, Grinding
Boring and Assembly Work
Jigs & Fixtures
Also Hardening for the Trade

A.I.D. and A.R.B. approved

B. TOONE
(NOTTINGHAM) LTD
NEWDIGATE ST.
NOTTINGHAM
Tel.: 76661-2-3

WOOD & METAL

PATTERNS

HAND MACHINE OR SHELL MOULDING
Keen Quotations Good Delivery

B. LEVY & Co. (Patterns) Ltd.
1-5 OSBERT ST., LONDON, S.W.1
Telephone: VICtoria 1073 & 7496

PROTOTYPE & PRODUCTION

ELECTRONIC WIRING, COIL WINDING,
INSTRUMENTATION & TESTING

SETON CREAGHE ENGINEERING LTD.,
G. W. Trading Estate, Park Royal Road,
N.W.10.

A.I.D. ELGAR 3356/7 A.R.B.

STAINLESS STEEL SPECIALISTS

Fabrication, welding and X-ray
inspection, pressings and machined
parts.

THE TAYLOR RUSTLESS
FITTINGS COMPANY, LIMITED,
Ring Road,
Lower Wortley,
Leeds, 12

COPPER BRAZING

WE ARE PLEASED TO ANNOUNCE THAT WE CAN NOW UNDERTAKE CUSTOMER'S WORK IN OUR NEW HEAT TREATMENT DEPARTMENT WHERE WE HAVE INSTALLED A HYDROGEN ATMOSPHERE CONTROLLED COPPER BRAZING FURNACE.

CAPACITY FOR SIZES UP TO 9in. SQUARE

Your enquiries will receive our prompt attention

F. PRATT & CO. LTD

Park Works, Halifax

Phone: Halifax 66371.5

ABBEY HEAT TREATMENTS LTD.
PLAZA WORKS, HIGH STREET, MERTON, S.W.19
FOR ALL TYPES OF HEAT TREATMENT.
WE COLLECT - WE DELIVER
TELEPHONE: CHerrywood 2291

RESEARCH

ENGINEERS LTD.

FOR

SUPER ACCURATE CAMS

SEE "MACHINERY" 22nd JANUARY 1954 FOR
METHOD OF CUTTING. REPRINTS AVAILABLE

NORTHAMPTON GROVE, CANONBURY, LONDON N.1

Telephone: CANONBURY 4244 (4 lines)

Telegrams: WILMAKET, NORDO, LONDON

NITRAM METAL TREATMENT & ENG. CO. LTD.
SILVERDALE ROAD, HAYES, MIDDLESEX

A.I.D. A.R.B.
APPROVED

COPPER BRAZING

TELEPHONE
HAYES 5111/2

Luton Engineering Pattern Co.
are prepared to undertake the manufacture of all classes of wood and metal patterns and accuracy and prompt delivery guaranteed.— Send your enquiries to 80A, Princes Street, Luton. Phone 961.

Centre Lathe Turning Up to
7 1/2in. centres by 48in. b.c. Tool, Prototype and small batch work. Modern plant. A.I.D. approved.—WARD ELECTRIC CO. (NORWOOD), LTD., 44, Chapel Road, W. Norwood, S.E.27. GIPsy Hill 1620.

A. I. D. ——— **THE** ——— CUN 5195
HEAT TREATMENT
PEOPLE OF LONDON
G.R.M. HEAT TREATMENTS LIMITED, PADDINGTON, W.9.

REPAIRS

By

WELDING

BROKEN MACHINE TOOL PARTS
& DAMAGED PLANT IN ALLOY STEELS,
CAST IRON & NON-FERROUS METALS
SPECIALLY REPAIRED BY WELDING

ESTABLISHED OVER 40 YEARS

THE BLAHER MOTOR WELDING CO. LTD.

Welding Engineers

DUKES RD. PARK ROYAL, LONDON W.1
Phone ACORN 4811. Grams: Blaherweld, Telus London

DAVIES-CHARLTON (U.K.) LTD.

STATION SAWMILLS, BARNOLDSWICK, VIA
COLNE, LANCs. TEL. BARNOLDSWICK 3310
A.I.D. APPROVED

Are specialists in component
production for the Aero-Jet
engine industry, and can offer
capacity on

**THREAD GRINDING
THREAD ROLLING**

Capstan, Auto and Centre Lathe
turning. External, Internal
Centreless and surface grinding.
Horizontal, vertical and profile
milling. Drilling, Tapping and
Honing.

QUOTATIONS FOR LARGE OR SMALL
QUANTITIES

**PROTOTYPES & SPECIAL
PURPOSE MACHINES**

REPAIRS & SALVAGE BY DISPOSITION
MACHINING, FORGING & FABRICATING
GEORGE MILLS (ENGINEERS) LTD.
BECKENHAM, KENT. TEL: SYDENHAM 5255

**Thames Valley Pattern Works
LTD.**

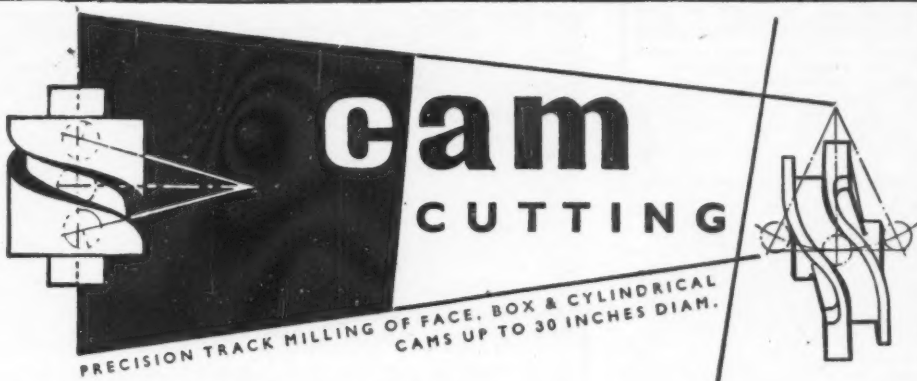
ELMTREE ROAD, TEDDINGTON
Phone MOL 698 MOL 6097
**ENGINEERS' PATTERNS
MODEL MAKING
INSTRUMENT CASES
PERSPEX MODELS & MOULDS**

**CAPACITY AVAILABLE
FOR DECEMBER**

600 hours Tool work
Rate 16/- per hour
Jigs and Fixtures
Special Purpose Machining
Prototype

F. H. PIKE & SON LTD.
29 Brunswick Street East,
Hove, 2, Sussex.
Phone: Hove 70418

When answering advertisements kindly mention MACHINERY.



cam
CUTTING

PRECISION TRACK MILLING OF FACE, BOX & CYLINDRICAL CAMS UP TO 30 INCHES DIAM.

ZEPHYR Engineers Ltd TEL: EUS. 7624
24/32 EUSTON BUILDINGS, LOND. N.W.1

•• MACHINING ••

AUTO TURNED PARTS

FINE TOLERANCES, MAX. DIA. 1 1/2 in.
INDEX SS & GRIDLEY MULTI AUTOS
THREAD CHASING MANUFACT'RS
ROLLER BOX TOOL HOLDERS

BENTON ENGINEERING CO. LTD.

Tenbridge Road, Harold Hill, Essex
Ingrebourne 43864/5

Barrel Finishing. Specialists in
Barrel Finishing. Compounds and media
supplied. Contract work undertaken—Send
samples to GRANATT CHEMICAL & ENGINEERING CO., Austin Road, Battersea,
S.W.11 MACaulay 7723.

Semi-automatic pinion cutting capacity
immediately available.

Large range of hobs held in stock.
Also capacity on Mikron 79s.

ROBERT PRINGLE & SONS
36-42, Clerkenwell Road, London, E.C.1
Telephone: CLerkenwell 2341

Thread Milling for the Trade
up to 6in. O.D. and 5in. I.D. Any thread,
any quantity. Keen prices for long runs.
Satisfaction guaranteed.

UNICORN PRODUCTS, Ltd.,
119-121, Stanstead Road, Forest Hill, London,
S.E.29. Telephone: Forest Hill 7688 (3 lines).

PRECISION & GENERAL MACHINING

including

Thread Milling • Radial Drilling
Metal Spinning

A.I.D. and I.F.V. Approved. Enquiries invited.
Surplice & Tozer Eng. Co., Ltd.

Acre Works, Windsor

Windsor 1657 & 1844

Member of the Metropole Group

GRINDING

IMMEDIATE CAPACITY AVAILABLE

CYLINDRICAL • INTERNAL • SURFACE

LATEST TYPE MACHINES

PLOUGH GRINDING — 24 HOUR SERVICE

also

General Machining, Fitting and Complete Assemblies
Special Purpose Machines Designed and Built
to Specification

We shall be pleased to advise on your Grinding and
Machining Problems

HOLLAND & CAESAR LTD

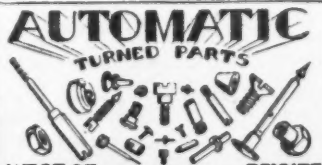
ENGINEERING CONTRACTORS

GRINDING SPECIALISTS

ORKEY WORKS, 3-5 LEIGHTON PLACE,
LONDON, N.W.5

Est. 1836

Telephone: Gulliver 3047 and 6444



AUTOMATIC
TURNED PARTS

WEST ST. REKATE 3177
AMBRESSEY
ENGINEERING CO. LTD.

CYLINDRICAL GRINDING CAPACITY

External up to 12in. dia. by 36in.
Internal up to 7 1/2in. by 8 1/2in.

MARSDEN & SHIERS, LTD
Davis Road, Chessington, Surrey.
A.I.D. & A.R.B. A.N.R. Approved.
Telephone: ELMbridge 5333 & 5334

Spur Gear and Sprocket Cutting
from blanks supplied or machined complete.
Phone: EUSTON 1354.

TURNER BROS.,
10, Pratt Mews, Camden Town, N.W.1.

When answering advertisements kindly mention MACHINERY.

PRECISION TURNED PARTSA.I.D., A.R.B., C.I.A. & I.F.V., APPROVED
AUTO AND CAPSTAN QUANTITIES

Send your specification to:

AYLESBURY TURNED PARTS

(True Screws) Limited

Britannia St., Aylesbury, Bucks.

Tel: Aylesbury 2424 (3 lines)

Automatic Work Up to 1½in.Immediate capacity available—
TRUE ENGINEERS, LTD.,
Wharf Lane, Bourne End, Bucks. Phone 1310.**Automatic and Capstan**Capacity Available up to 2in. dia.—
WILLIS ENGINEERING, 65A, High Street,
Hampton Hill, Middlesex. Molesey 4273.**Automatic Turned Parts, Press**Work, Press Tool Making, Capstan and
Centre Lathes, Milling, Drilling, Thread Milling.
Capacity available.—PARKER ENGINEERING
(KINGSTON), LTD., 200-202, Cambridge
Road, Kingston-on-Thames. KIN. 5501.**Planing Capacity, Heavy or Light**Turning up to 5ft. diameter.
Special machines to customers' design.
F. ATKINSON & SONS, London, LTD.,
65, King's Cross Road, W.C.1. Terminus 4050.**Immediate Capacity Turning,**capstans, milling, drilling, die and tool
making.—MILLS ENGINEERING, PIPES
DUCTS, LTD., Barnet. Tel.: BARNET 0744.**Metal Spinnings. Immediate**capacity for metal spinnings and sheet
metal work. A.I.D. approved.—HIGHBURY
METAL SPINNING CO. (1955), LTD., 30,
Highbury Place, N.5. CANONbury 2906.**Horizontal Production Milling**for the trade. Slots, flats, squares, etc.,
of all descriptions milled on latest plant. Keep
prices for long runs, satisfaction guaranteed.—
UNICORN PRODUCTS, LTD., 110-131, Stan-
stead Road, Forest Hill, London, S.E.23,
Telephone: Forest Hill 7688 (3 lines).**Capstan and Turret Lathe**Capacity available up to 4½in. diameter
bar and 22in. diameter chucking. Castings and
Forgings a speciality. Milling, drilling and
centre lathe turning. High class work with
prompt delivery. Enquiries invited to:—WHITWAM & ELEY,
22/24, Stafford Road, W.3. Acorn 8364.**Automatic Capacity Available**on Index single spindle autos. up to 2in.
dia.—ARTHURS ENGINEERING, Hershams
Trading Estate, Molesey Road, Hershams,
Surrey. Phone: Walton-on-Thames 5119.**Capstan Capacity Immediately**available, 8 B.A.—1½in. Steel or Brass.
Large stocks of raw materials.—
SACRON, LTD.,
7, Chiswick High Road, W.4. Tel. CHISwick 3595**Capstan Capacity Immediately**available 10 B.A. to 1½in. B.M.S. Stainless
Brass, etc. All materials in stock.—CHISWICK
ENG., LTD., Pluckington Place, Southall,
Middlesex. Tel.: Southall 2247.**High Precision Grinding of**Tungsten Carbide and Steel Tools.
Accurate profile grinding and progression tools
a speciality.—S.T. LTD., 22-26, Upper Mulgrave
Road, Cheam, Surrey. Phone: Vigilant 0074/5.**FINE LIMIT GRINDING**
MILLING, TURNING, DRILLING.
Complete Service Offered.**SETON CREAGHE ENGINEERING LTD.,**Trading Estate, Park Royal Road, N.W.10
A.I.D. ELGar 3356/7 A.R.B.

Centreless Grinding

ALL TYPES OF FORM, THROUGH AND PLUNGE

BAR GRINDING

½in. to 5in. DIA. UP TO 15ft. LONG

IMMEDIATE CAPACITY ON CAPSTAN MILLING
CENTRE LATHES, AUTO AND ALL TYPES OF GRINDING**REDCAR ENGINEERING CO. LTD.**

HOLLY ROAD WORKS, TWICKENHAM, MIDDLESEX. Tel. POP 6157 & 7088

A.I.D. & A.R.B.
APPROVED**WE WOULD WELCOME YOUR ENQUIRIES FOR :—**

- MILLING—Horizontal & Vertical.
- CENTRE LATHES to 38in. Dia.
- CAPSTANS to 2½in. Dia.
- PLANING TO 6ft. x 3ft. x 3ft.
- BORING—Horizontal & Vertical.
- Cylindrical Grinding to 20in. Dia. x 84in.
- Surface Grinding to 24in. x 8in.
- Drilling and Thread Tapping.

A.I.D. APPROVED

BOWES ROAD ENGINEERING CO. LTD.

BOWES ROAD, NEW SOUTHGATE, N.11. Phone BOW 2284/5/6

E. R. LATTIMER LTDA.I.D. & A.R.B.
APPROVED

Offer Complete Service for
PRECISION PROFILE MILLING, JIG BORING
LIGHT TO MEDIUM COMPONENT MANUFACTURE
TOOL DESIGN & MANUFACTURE
SMALL ASSEMBLIES, DIE & MOLD MANUFACTURE
SMALL PRESSURE DIE CASTINGS
IN HAZARDOUS ALLOY TO B.S. 1008
SUPER PRECISION HYDRAULIC COMPONENTS AND ASSEMBLIES
FOR WHICH WE HAVE HYDRAULIC TESTING EQUIPMENT

SHAKESPEARE
STREET,
SOUTHPORT

Phone: 57696 7

AUTOPRODUCTIONS LTD.Automatics: Single Spindle
Index "18" "24" "36" "52" "B.42"
Multi Spindle: 1in. and 1½in. WickmanCapstan
Drilling
MillingCentreless Grinding
Polygon Turning
Chemical Blacking

CAPACITY AVAILABLE

53, Green St. Sunbury-on-Thames
Phone: 2499**PLOUGH GRINDING**

24 hr. Service

High Speed Service Tool Co. Ltd.
Maple Road, Surbiton, Surrey.
Elmbridge 1133-6-7.**ROSSER & RUSSELL LTD.**Queen's Wharf, Hammersmith,
LONDON, W.6.

Telephone: RIVerside 4161.

GENERAL ENGINEERS
AND
MANUFACTURERS OF
SPECIAL MACHINERY
TO
CUSTOMERS DESIGN**WE MAKE TANKS, FRAMES, DUCTS, INSTRUMENT PANELS AND CHIMNEYS.**Let us have your enquiries for welded
fabrications large or small. And we can
press 200 Tons, guillotine ½ in. plate,
bend and cylindrical roll.
SHELMERDINE & MULLEY LTD.
EDGWARE ROAD, CRICKLEWOOD,
N.W.2.
GLAdstone 7677-8

When answering advertisements kindly mention MACHINERY.

MACHINING CAPACITY AVAILABLE

PHONE: KIN 6112

CAPSTAN
TURNING
MILLING
DRILLINGSEND US
YOUR
ENQUIRIESTURRET LATHES
CENTRE LATHES
ALL GRINDERS
ETC.GOOD DELIVERIES — QUALITY — KEEN PRICES
W. G. MARSDEN ENG. LTD. 30 FIFE ROAD, KINGSTON, SURREY.

EST 1890

CHATER-LEA

MFG. Co. Ltd.

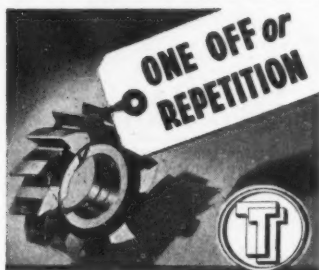
INVITE ENQUIRIES FOR ALL TYPES OF MACHINING, INCLUDING BROACHING, GEAR CUTTING, THREAD ROLLING, GRINDING (INTERNAL, EXTERNAL AND CENTRELESS), ALSO HEAT TREATMENT, PLATING AND FACILITIES FOR TOOLING, CUSTOMERS MATERIAL OR WE WILL SUPPLY.

NEW ICKNIELD WAY, LETCHWORTH, HERTS.

A.I.D. A.R.B. I.F.V. APPROVED

TEL: LETCHWORTH 490

CUTTING TOOLS AND PRECISION GRINDING

**TECHNITOOLS LIMITED**

129, WINDMILL ROAD, WEST CROYDON, SURREY

TELEPHONE AND INLAND TELEGRAMS: THORNTON HEATH 402

IMMEDIATE CAPACITY AVAILABLE

for Precision turned parts Swiss & Turret type Automatics. Capstan work. Centre lathe small gear cutting, milling & assembly etc.

We would welcome your enquiries

MURRAY, SON & CO. LTD.
Tottenham Lane, Hornsey, London, N.8.
MOUNtview 3019/2261**MACHINING****ECLIPSE****METAL INDUSTRIES LTD.**
Sedgley Rd. West Tipton • Staffs.GENERAL ENGINEERING WORK
PRODUCTION OR PROTOTYPE
JIGS • FIXTURES • ASSEMBLY
Pressure diecasting in zinc or lead**CAMS**FOR
ALL
SINGLE
SPINDLE
AUTOSAPPROX
48
HOURS
DELIVERY**EDWARDS BROS.**ST GEORGE LANE, SOUTH WOODFORD, ERM
TELEGRAMS: WARD/120 1927**CAPACITY AVAILABLE**TRADE WORK DIVISION
PRECISION**MACHINING** of most
descriptions
GENERAL ENGINEERINGand
MANUFACTURING
A.I.D. and A.R.B. approved**S. M. STUART-TURNER & CO.**

(SURREY) LTD. FAIRVIEW ROAD MOREBURY

LONDON S.W.14 TEL POLLARDS, 2231 2

GRAMS: AEROGUIP STREATH LONDON

Gear Cutting, Auto Turret, Capstan
and Centre Lathe Turning, Milling,
Planing, Hardening and Grinding,
Profile Cutting and Welding.**SMITH & NETHERWOOD,**
LTD.Tanyard Road, Quarnby,
HUDDERSFIELD.

Phone: MILNSBRIDGE 1888.

W. D. HORNE & CO.,
LTD.**MILLING TURNING
DRILLING CAPSTAN
CAPACITY AVAILABLE**Woodbridge House, Aylesbury Street
London, E.C.1
CLERkenwell 6668 & 6980**1½ in. Bar, 4 in. Chucking
AUTO CAPACITY****ECONOMIC PRICES from 500 UP**
made possible by**THE HYDRO COPYING TAREX**HUNTLEY & SPARKS, LTD., Wandle Road,
London, S.W.19, A.I.D., A.R.B. LID 2446**PLANING CAPACITY AVAILABLE**

On accurate machines—

Dimensions up to:

Length 24ft: Width 8ft:
Height 6ft. Weight up to 12
tons.Heavier work by special
arrangement.

Please contact

SOAG MACHINE TOOLS LTD.,

Juxon Street, Lambeth, S.E.11.

Phone: Reliance 7201 Grams: Sotoolag
London, S.E.11**Multi-spindle and Single-spindle**Auto Turning up to 2 in. bar capacity
capstan turning from the bar up to 2½ in. dia.
chuck work up to 1½ in. dia., thread milling,
milling, shaping, drilling, etc., capacity available.
Any tolerance and quantity. Satisfaction
absolutely guaranteed.—**TRICORN PRO-**
DUCTS LTD., 110-112, Stanstead Road, Forest
Hill S.E.26. Phone: FOREST Hill 7688 (3 lines).When answering advertisements kindly mention **MACHINERY**.

► We are equipped to provide a first-class machine shop capacity

PLANING 12 FEET • HORIZONTAL BORING • VERTICAL BORING • RADIAL DRILLING
CENTRE LATHES • COMBINATION TURRET LATHES • HORIZONTAL MILLING
VERTICAL MILLING • GRINDING • DRILLING • WELDING • PROFILING • HONING

D. A. GUNN ENGINEERING LTD

32 PARK ROAD NORTH • LONDON • W.3 Tel.: ACOrn 4841/4

SEND
US
YOUR
ENQUIRIES

Immediate Capacity Available

New Wickman, 11in., 5 spindle, Bar Auto, and New No. 1D Scrivener Centreless Grinder and subsequent operations if required.

High class A.I.D. and A.R.B. or commercial.

HUGHES ENGINEERING CO. (LEICESTER), LTD., Noble Works, Briton Street, Leicester. Telephone: Leicester 58196/7.

Cylindrical and Internal Grinding

max. swing 8in., capacity available. Close limits. Modern plant. A.I.D. approved.—WARD ELECTRIC CO. (NORWOOD), LTD., 44, Chapel Road, West Norwood, S.E.27. Gipsy Hill 1020.

Metal Spinnings Produced to

your requirements. Economically. On Time. A.I.D. approved.—MARTIN-GOLD LTD., Maybury Gardens, N.W.10. WIL 3888.

Capstan Capacity Available

1in. to 11in. Stainless, H.T., B.M.S., etc. No quantity too small.—ACME WORKS, Pluckington Place, Southall, Middx. Tel.: Southall 2247.

Immediate Capacity Available,

on single spindle Automatics up to 11in.—JAN PRECISION SCREWS, 33, Woodthorpe Road, Ashford, Middlesex. Phone: Ashford 4524.

Large Planing Capacity—

Early in 1959 Capacity will be available on large Planing Machines fitted with surface grinding equipment. Largest Machine Capacity 40ft. 0in. x 7ft. 0in. x 5ft. 0in.

Enquiries to:

SENTINEL (SHREWSBURY) LIMITED
Shrewsbury,
Shropshire.

• PRESS WORK •

SUB-MINIATURE PRESSINGS

and multi-stage precision press work
in all materials
PROMPT DELIVERIES

G. A. PRECISION PRODUCTS LTD

No. 2 Factory, Darkes Lane
Potters Bar, Middlesex
Potters Bar 6895

Pressings and Stampings, Ltd.,

Eccleston Road, West Ealing, W.12. Presswork up to 150 tons. Double action deep-drawing guillotine 8ft. by 10 S.W.G. Spot welding.—Assembly. Tool making and electroplating.—Phone: Ealing 3667-8.

PRESSWORK PRODUCTS LTD
Specialists in Accuracy

May we help you?
WRITE OR PHONE US AT

STATION WORKS
LUDLOW ROAD
MAIDENHEAD • BERKS
Phone: Maidenhead 700 (3 lines)

LIGHT PRESSINGS—
DEEP DRAWING—
SPRING
PRESSINGS—

Metal Pressings

TO ANY TOLERANCE
SHAPE OR QUANTITY

SERVICE and PRECISION
at COMPETITIVE PRICES

ECONOMIC STAMPINGS LTD.

DISRAELI STREET, LEICESTER • TELEPHONE 32233
MEMBER OF THE BENTLEY GROUP

Pressings in All Metals Up to 60 tons. Press tools manufactured in our own toolroom. Light assemblies. Domestic Electrical and Mechanical. All finishes. A.I.D. and A.R.B. approved. Advice and estimate given free. Enquiries to:

METAL COMPONENTS, LTD.,
Dolphin Road, Shoreham-by-Sea, Sussex.
Phone: Shoreham-by-Sea 2234/5.

PRESSWORK

PRESS TOOLS
JIGS & FIXTURES
GRAVITY DIES
ASSEMBLIES

The
**THORAN ENGINEERING
COMPANY LIMITED**

SOUTH POTTERIES ESTATE
WHITE HART LANE
TOTTENHAM N.17

TELEPHONE: BOWES PARK 8383

• TOOLMAKING •

CHIS R. E. CARDER LTD. CHIS
5842. 4611.
1 & 2, Chiswick Common Road, London, W.4

JIGS — TOOLS — AND PRESS TOOLS
UNIVERSAL GRINDING

—JIG BORING, GENERAL
GOOD CLASS MACHINING WORK—
DESIGN OFFICE & DEVELOPMENT WORK

COVENTRY GRINDERS LIMITED

AID, ARB, IEME Approved

Phone: 73344/5

FORM GRINDING SPECIALISTS

Send us your enquiries for Gauges, Form Tools, Copying Lathe Templates, Jigs & Fixtures, Impact Punches & Dies, Precision Cams, Crushers, Prototype components, Centreless, External, Internal, Blanchard, Surface & Jig Grinding, Etc. A complete tool room and gauge room at your service.

When answering advertisements kindly mention MACHINERY.

Classified Advertisements (CONTRACT WORK, contd.)

LOOK TO

LENCHS

(BIRMINGHAM) LTD
TOOLMAKERS
 Barr St., BIRMINGHAM 19.

Literature on request

Sole Manufacturers of:

OAKALOY

CARBIDE TOOLS & TIPS

PRESS TOOLS - JIGS -
 FIXTURES

Tel: Northern 8421 (4 lines)

PRECONOMY CO LTD

PRECISION Moulds and Press tools

Jigs and Fixtures **ECONOMY**

Eastfield Side, Sutton-in-Ashfield, Notts

A.I.D. A.R.B.
 Member of the Gauge & Toolmakers Association

- **MOULDS** Compression and Injection Plastic
- **MOULDS** Pressure Diecasting
- **MOULDS** Rubber and Gravity
- **JIG & FIXTURES**
- **PRESS TOOLS**
- **PRESS WORK** up to 25 tons
- **AUTOMATIC & CAPSTAN**

TURNED PARTS

TO BE PRECISE IT'S
Camdentools

21-22, HONYWOOD ROAD,
 BASILDON, ESSEX.
 Phone: Basildon 20506/7.

DORMER & WADSWORTH LTD

PLASTIC
 Moulds
 PRESS TOOLS
 JIGS
 FIXTURES, ETC.

51-53
 BICKENSTETH RD.,
 MITCHAM RD.,
 TOOTING,
 LONDON, S.W.9

TELEPHONE BALHAM 1006 (2 LINES)

JIG BORING

ON **JIG BORERS**

EDMONTON TOOL & ENG. CO LTD

141, HERTFORD ROAD, EDMONTON N.9
 TELEPHONE: EDMONTON 4412/3

SPURS, SPIRALS, BEVELS, WORMS
 & WORMWHEELS

GEAR CUTTING

MacDowall

JIGS, FIXTURES
 PRESS TOOLS &
 GAUGES
 PRECISION ENGINEERS
 SPECIAL MACHINERY

MACDOWALL EQUIPMENT COMPANY LIMITED
 NORTH STREET ROMFORD ESSEX

ROMFORD 61981

Capacity Available. Press Tools,
 Jigs, Fixtures, Production of Metal
 Pressings. Prototypes and Jobbing. Light
 Assemblies.

ELLIOTT & WEST,
 587, Liverpool Road, N.7. Phone: NORTH 2366.

Capacity Available. Press Tools
 Jigs and Fixtures. Test Rigs a speciality.
 Contract Jig-boring. Ring Portsmouth 23852
 and our representative will visit you within 24
 hours to discuss your requirements.

ALAN BRADLEY ENGINEERING CO., LTD.,
 South Street, Portsmouth, Hants.
 A.I.D. Approved.

★ **PRESSURE
 DIE-CASTING DIES**

PRESS TOOLS · JIGS · FIXTURES · GAUGES

★ **MOULDS FOR
 PLASTICS**

SHINDLER ENGINEERING CO LTD

ST. CHADS PLACE, KING'S CROSS, W.C.1 TELEPHONE: TEARMS 0441

When answering advertisements kindly mention MACHINERY.



THE FIRM WITH HALF A DOZEN JIG BORERS for PRESS TOOLS etc.

HIGH SPEED SERVICE TOOL CO. LTD.
Maple Road, Surbiton, Surrey. E135-6-7
STUDER PROFILE GRINDING A SPECIALITY.

PRESS TOOLS

STAMPINGS

JIGS, FIXTURES,
PRESSURE DIES,
GENERAL MACHINING,
JIG BORING, PRESS WORK,
ETC.

Please send your enquiries to

THE MIDDLETON TOOL & ENG. CO. LTD.
ALEXANDRA RD., PONDERS END, MIDDX.
Telephone: HO 2252/3/4

Press Tools

JIGS FIXTURES GAUGES

JIG BORING

ON NEW 4G SIP JIG BORER

THE MITCHAM JIG & PRESS TOOL Co. Ltd.
BENEDICT RD., MITCHAM, SURREY
Telephone: Mitcham 3635

SPECIALITIES

BANDSAW

1,000,000 (FEET) IN STOCK
HIGH-CLASS METAL-CUTTING
BANDSAW

ALL COMMERCIAL WIDTHS AND PITCHES

**GEORGE H. ALEXANDER MACHINERY
LIMITED**
82-84 COLESHILL STREET, BIRMINGHAM, 4
'Phone: Aston Cross 3264 (7 lines)
'Grams: Viking, Birmingham

AUTOMATIC NUMBERING MACHINES

for
MARKING
ALL TYPES
OF METALS

Phone
GERrand 5051

A.E. GALE LTD.
ARCHER ST. WORKS
ARCHER STREET
SHAFTESBURY AVE.
LONDON W.1.

TIME RECORDERS—Sales—
Rental Service. Tel. HOP 2239.
TIME RECORDER SUPPLY &
MAINTENANCE CO., LTD.,
187/159, Borough High Street, London, S.E.1

Machine Engraved Feed Dials.
Scales, Nameplates, Labels, etc., in Metal
and Plastic. Quick Delivery.—O. H. KAMPF
& CO., Tanyard Works, Beaminster, Dorset.
'Phone: Beaminster 440.

Tungsten Carbide Tool
Manufacturers of standard and special form
tools in high speed steel and tungsten carbide.
Our range includes reamers, cutters, workrest
blades and wear-resistant parts.
'Carbide supplied to customers' specification
and extreme service given for emergency tooling.
DIAGRIT GRINDING CO., LTD.,
Marden, Kent.
'Phone: Marden 362.



BRAND NEW BALL & ROLLER BEARINGS
OVER 5,000,000 IN STOCK IN MORE THAN 5,000 TYPES
BRITAIN'S LARGEST STOCKS
WRITE FOR STOCK LISTS
CLAUDE RYE BEARINGS
895-921 FULHAM RD., LONDON S.W.6
RENOWN 6174 (EXT. 24) TELEX 2-3453



WIDDOWSON'S specialise
in re-building
your
CINCINNATI
MILLING MACHINE

HERBERT WIDDOWSON & SONS LIMITED
CANAL STREET WORKS · NOTTINGHAM · ENGLAND TELEPHONE 42061

Albion
COUNTING INSTRUMENTS



(patented design)
Send for catalogue
to Instrument Division
B. & F. CARTER & Co. LTD.
BOLTON 19 Bolton 4344 (3 lines)

'BRONTE'
BRONZE SEATED
PIPE UNIONS
The Popular Steam Joint
WALTER SLINGSBY & CO. LTD.
WASK WORKS KEIGHLEY

If you use compressed air
YOU NEED
Norgren
EQUIPMENT



**FILTERS
LUBRICATORS
REGULATORS**

C. A. Norgren Ltd., Shipston-on-Stour
Warwickshire. Telephone: 110 & 106

Universal
Ball Bearing Co.
111-115 Hammersmith
Grove, London, W.6
FACTORS
MANUFACTURERS
AND REPAIRERS



Phone: Grams: "Universal Bearing
Riverside 3262-3-4. Hammersmith"

TAPERLOCK & TRILOCK GAUGE HANDLES
Engraving Service & BLANKS Complying to B.S. 1044
Blanks in soft and annealed condition or in hardened state with centres lapped
and taper ground to size. Handles anodised to your specific colour



BRILHART LTD · HATFIELD · DONCASTER · Tel: Stainforth 595

When answering advertisements kindly mention MACHINERY.

**FLEXIBLE
METALLIC CONDUIT**
and solderless couplings
For protecting cables leading to:
motors, switchboards,
starters, etc.
ALL SIZES FROM
1/4 in. to 3 in.



THE DONOVAN ELECTRICAL CO. LTD.
(Wholesaling Division)
GRANVILLE STREET · BIRMINGHAM 1

Cleveland Automatics Rebuilt
by experts. Replacement Parts. Manu-
facturers of Roller Boxes, Turret and Crow Slide
Tooling.—**THE TIMS ENGINEERING CO.,**
LTD., Vilecarb Works, Springfield Walk,
Kilburn, N.W.6. Phone: MAIDA Vale 0049.

Capstan Users. Your Forming
can be done entirely free of cost by using
our new patent toolholder. Many other advan-
tages. Cost often recovered on first job.
ETHOR SUPPLY CO.,
70, Exeter Road, Harrow, Middlesex.

The "Coxeter" Revolving
Centre, from 70c. All sizes from stock.—
REVOLVING CENTRES, LTD., Oxford.

ANNOUNCEMENTS

WORK TO PLACE

Advertisers — London Area —
wish to contact modern iron foundry with
good machining facilities, including vertical and
horizontal boring, to supply castings and
assemble machinery weighing up to 2 tons.—
Write BOX 2665, MACHINERY, Clifton House,
Euston Road, N.W.1.

BUSINESS PROPOSITIONS

£500,000 AVAILABLE
to purchase an old-estab-
lished Business in any Trade.
Present Management can
remain.

Write in confidence to:
REGINALD TERRELL
BUSINESS BROKERS LTD.
46 St. James's Place,
London, S.W.1. (HYD. 1678)

PACKING AND SHIPPING

R. & J. PARK, LTD., Dominion
Works, Chiswick, England. Export
packers, shippers and forwarding agents.
Specialists in packing heavy machinery.

Classified Advertisements (ANNOUNCEMENTS, contd.)

EDUCATIONAL

Works Study. Next Full Time
course (6 weeks) starts January 5.
Syllabus from SCHOOL OF TIME AND
MOTION STUDY (Founded 1951), 29, Cork
Street, W.1.

BUSINESS OPPORTUNITIES

Sheffield Engineering Firm with
comprehensive engineering plant and
extensive experience in the design and production
of all types of machinery, including special
purpose plant, wishes to undertake the manu-
facture of complete or part assemblies, including
assembly line production. Own Drawing Office
and Pattern Shop. Technical Representatives
in all areas.—BOX L771, MACHINERY, Clifton
House, Euston Road, N.W.1.

General Engineering Company
in South London area offers on lease
approx. 2,500 sq. ft. of factory space with all
services. Tenant preferred would be one
engaged on light engineering work who would be
prepared to undertake light precision machining
for the lessor.—BOX Z664, MACHINERY, Clifton
House, Euston Road, N.W.1.

Illness Presents a Genuine
opportunity to a working engineer with no
ties. Must have go ahead ideas and contacts.
To let, a small light engineering factory situated
a few miles from Oxford, laid out for milling,
turning, drilling, auto, etc. Reasonable rental
to include rate, electricity, use of plant and
machinery, also office and phone. Proof of
ability and references essential.—BOX Z691,
MACHINERY, Clifton House, Euston Road,
N.W.1.

PHOTOGRAPHY

Miles & Kaye, Ltd., 102, South-
ampton Row, London, W.C.1. Hoborn
6858. Specialists in commercial and industrial
photography for over 60 years. All branches
of photographic work undertaken.

Photographs by MACHINERY
set the standard in engineering publicity.
Our studio is one of the best equipped in the
country. Ideal for really good photographs of
tools, attachments and portable equipment.
Mobile units available for taking photographs
in black and white or in natural colour in your
own or your customers' works. Specimens of
work submitted on request.—Full particulars
from the SERVICE MANAGER, MACHINERY
PUBLISHING COMPANY, Ltd., National
House, West Street, Brighton, 1.

PATENTS—TRADE MARKS

Bosshardt, Percival, & Co.
(Chartered Patent Agents), 94, Market
Street, Manchester, 1. Telephone: Manchester,
Blackfriars 6758.

The Proprietors of Patent No.
713053 for "Method of and Apparatus for
Controlling the Tools of Machines for Grinding
and/or Polishing Glass." Patent No. 754357 for
"Improvements in or relating to a method of and
apparatus for controlling the tools of machines
for Grinding and/or Polishing Glass," desire to
secure commercial exploitation by Licence or
otherwise in the United Kingdom.—Replies to
Haseitine Lake & Co., 28, Southampton Build-
ings, Chancery Lane, London, W.C.2.

MATERIALS FOR SALE

E. Stephens & Sons, Ltd., Bath
Street, London, E.C.4. CLE. 1721. Tube
Rounds, Flats, Hex. Cut to size. Quick
delivery.

MATERIALS WANTED

Steel, Aluminium, Brass, Sheets,
and Offcuts 10 to 24c. Small or large
quantities. Cash payments.—DYAS & FOWLE,
41, Loudoun Rd., N.W.8. MAIDA VALE 2711, 6477

BRITAIN'S BIGGEST BUYERS

WANT
NEW BALL & ROLLER
BEARINGS
OF ALL TYPES & SIZES
CLAUDE RYE BEARINGS

895-921 FULHAM RD. LONDON, S.W.6
RENOVA 6174 (EXT. 24) TELEX 2-3453

PLANT WANTED

ACME GRIDLEY 2½ in., BAR, 4-Spindle
Model R or RA, in new condition. Box
Z686, MACHINERY, Clifton House,
Euston Road, N.W.1.

Harry Kirk Will Purchase
modern quality machine tools for cash.
Whole plants or individual items. Full details
to:—

HARRY KIRK ENGINEERING, LTD
Machine Tool Division,
Brandon Road Works,
Brandon Road, Coventry.
Telephone: Walsgrave-on-Sowe 2213/4

3 Dimensional Diesinking Ma-
chine, Deckel or Alexander.—Details and
price to BOX Z357, MACHINERY, Clifton House,
Euston Road, N.W.1.

CENTAUR TOOL WORKS,
Birmingham, 18, pay best prices for good
modern secondhand Machine Tools by first-class
makers. Write or 'phone and our representative
will call. 'Phone: EDGBASTON 1118 and 1119.
'Grams: Capetan, Birmingham.

kent
Give Value

WHETHER BUYING OR SELLING
USED MACHINE TOOLS

Contact:—
K.E.N.T. MACHINERY & ENG. CO.
Datchelor Place Mews, London, S.E.5.
Telephone: ROD 4149.

NORTON

GENEROUS PRICES
for "NEARLY NEW"

MEDIUM &
HEAVY DUTY MACHINE TOOLS
Ring: TATe Gallery 0633/4

REVERSE CHARGE
TELEPHONE CALLS
ACCEPTED!

WENORTON LIMITED
GROSVENOR GARDENS HOUSE, GROSVENOR GARDENS
LONDON S.W.1 Telephone: TATe Gallery 0633/4

B.G. MACHINERY, LTD.,
Montgomery Street, Sparkbrook,
Birmingham, 11. will pay good prices for
Machine Tools of first-class make and in good
condition.—'Phone: VICTORIA 2351/9.

WANTED GOOD
MACHINE TOOLS

Offer your Surplus Tools
to us. We pay a good price

M. WARD

(MACHINE TOOLS) LTD.
1, KILBURN HIGH ROAD,
LONDON, N.W.6

MAIDA VALE 1195-96
Telegrams: Emwarneor, KIL, London
One minute from Kilburn Park Station
Bakerloo Railway

2 us.

WILLIAM
URQUHAR
Proprietors: EXORA.
M. & E. Urquhart
MODERN MACHINE TOOLS
of all types.
GOOD PRICES. Send details to
WM. URQUHART,
1023/27, Garratt Lane, London, S.W.17
Tel: BALHAM 8551

MC

WE ARE KEEN BUYERS
OF GOOD MODERN
MACHINE TOOLS.
INSPECTION WILL BE
ARRANGED AT ONCE.

M. C. LAYTON LTD.
96-98 VICTORIA STREET,
LONDON, S.W.1

Telephone: VICTORIA 7778/9.

Classified Advertisements (PLANT WANTED, contd.)

**Wanted
Urgently**

Late Type Machine Tools
Best Prices are offered for latest types of Machine Tools. Send us details of what you have and our representative will call to inspect

J. B. MACHINE TOOL CO. LTD.
312 BRADFORD ST., BIRMINGHAM 5
Telephone: MIDland 4375

**WANTED
GOOD CLASS MACHINE
tools and sheet metal
machinery.**

EDWIN MILLEN
70 Clerkenwell Road, London, E.C.1
Phone: Clerkenwell 6064

**WANTED
ALL TYPES OF MODERN
MACHINE TOOLS**

Please write or phone details to:
THE MIDLAND MACHINE TOOL CO.
BRADLEY, BILSTON, STAFFS.
Tel.: Bilston 42471/4

WANTED

Horizontal, Vertical Boring Mills;
Bullard Vertical Turret Lathe;
Radial Drill, Milling Machine,
American Made

BOX P. 32, MACHINERY,
Clifton House, Euston Road, N.W.1

Precimax Cylindrical Grinder
MPO 5/18. Full particulars serial number and price.—BOX Z660, MACHINERY, Clifton House, Euston Road, N.W.1.

WANTED!**USED MACHINE TOOLS**

We offer generous prices for your plant or accept in part exchange for modern equipment

E. H. JONES
(MACHINE TOOLS) LTD

48, HIGH ST. EDGWARE, MIDD^X
Telephone: EDGware 4488/9
BIRMINGHAM: MIDLAND 5393

**SURPLUS MACHINE
TOOLS REQUIRED**

OFFER YOUR MACHINES TO
J. E. RAISTRICK LTD.

POYLE TRADING ESTATE
COLNBROOK, SLOUGH,
BUCKS.

TEL: COLNBROOK 2421

Wanted, Machine Tools and
Sheet Metalworking Machinery of modern design.—H. BELL (MACHINE TOOLS), LTD., Walter Street, Leeds, 4. Tel. 63-7398.

Power Presses, 40 Tons, with
adjustable stroke to 2in., also to 4in.—Required by SEARCHLIGHT, 139, Bello Bridge Road, Acton, Acorn 1077.

Straightening Rolls. 5 or 7-roll
type, capable of straightening 6in. by 4in. thick steel.—BOX Z694, MACHINERY, Clifton House, Euston Road, N.W.1.

Two Secondhand No. N3 Heenan
& Froude Nail Machines required.—Advise price, age and condition to BOX Z695, MACHINERY, Clifton House, Euston Road, N.W.1.

Machine Tools and Sheet Metal
Working Machinery, modern items of all types required.—CHARLES E. MATTHEWS (MACHINE TOOLS), LTD., 34, Gladstone Road, Croydon. (Thornton Heath 1783.)

**WANTED
MODERN MACHINE
TOOLS**

We pay cash for single machines or complete plants

SEND US DETAILS
IMMEDIATE INSPECTION ARRANGED
**SOUTHERN ENGINEERING
AND MACHINERY CO.**
CONNAUGHT BUILDINGS
TANNERS BROOK, MILLBROOK
SOUTHAMPTON
Telephone: Southampton 73101/2/3

**A. LAWRENCE & CO.
(MACHINE TOOLS) LTD.**

will be pleased to purchase your surplus Modern Machine Tools either on a cash or part exchange basis. Ask our representative to call and inspect.

**Welsh Harp, Edgware Road,
London, N.W.2**
Telephone: GLAdstone 0033

Wanted, Index OR12 Autos. in
good condition. Serial No. 8500 or later.—Phone Cobham (Surrey) 3301.

Wanted. Reasonably Modern
machine tools and sheet metal working machinery. Best prices paid.—W. FORREST & CO., LTD., Industry Works, Sylvester Gardens, Sheffield, 1. Sheffield 23314/5.

Draw Benches Wanted. 10-20
tons pull; 16ft. to 26ft. draw.—Full details of price, condition, location, to F. J. EDWARDS LIMITED, 359, Euston Road, London, N.W.1. Euston 4681.

Machine Tools, Power Presses
and Sheet Metal Machinery. Single machine or complete plants purchased immediate inspection.—ALBERT EDWARDS (MACHINERY), LTD., 79/89, Pentonville Road, London, N.1.

Wanted, Greif Double Ended
band grinder and polisher with independent spindle drives giving a speed of approximately 2,000 r.p.m. Suitable for use with 1in. to 4in. wide belts.—BOX Z702, MACHINERY, Clifton House, Euston Road, N.W.1.

Wanted—1 Secondhand Bliss 12A
or 12B semi-automatic double seaming machine in good working order. State lowest price.—BOX Z700, MACHINERY, Clifton House, Euston Road, N.W.1.

PLANT FOR SALE

HENRY BUTCHER & CO.

Specialists in the

• VALUATION AND SALE OF FACTORIES, PLANT AND MACHINERY •

73 CHANCERY LANE, LONDON, W.C.2

TEL: HOLBORN 8411 (8 lines) GRAMS: PENETRANCY, HOLB., LONDON

When answering advertisements kindly mention MACHINERY.

PING BELLS for machine tools LEEDS 63-7398

CINCINNATI No. 3 Dial Type Vertical Milling Machine. Speed Range 18-450 r.p.m.

HERBERT 47V Vertical Milling Machine. Speed Range 21-750 r.p.m.

ARCHDALE 18in. Vertical Milling Machine. Speed Range 79-2,000 r.p.m.

ARCHDALE 30in. Vertical Milling Machine. Speed Range 29-522 r.p.m.

MILWAUKEE 2H Universal Milling Machine. Speed Range 30-1,400 r.p.m. Comprehensive equipment.

BROWN & SHARPE No. 2 Universal Milling Machine. Speed Range 40-1,300 r.p.m.

PARKSON 2T Universal Milling Machine. Speed Range 15-860 r.p.m. Comprehensive equipment.

PARKSON 1NA Universal Milling Machine. Speed Range 17-450 r.p.m. Comprehensive equipment.

EDGEMOND No. 2 Plain Milling Machine. Speed Range 21-850 r.p.m.

ARCHDALE 20in. Production Milling Machine. Speed Range 30-619 r.p.m.

BROWN & SHARPE No. 10 Production Milling Machine. Speed Range 30-1,800 r.p.m.

WARD 7 Combination Turret Lathe. Taper Turning. Bar Feed and Chucking. Speed Range 37-750 r.p.m. Comprehensive equipment.

WARD 7, 3A, 2A, 1A Capstan Lathes arranged Bar Feed.

NORTON 16in. x 50in. Universal Grinding Machine. Comprehensive Equipment.

CHURCHILL 12in. x 30in. Universal Grinding Machine. Comprehensive equipment.

NEWALL Type L 10in. x 36in. Plain Grinding Machine.

JONES & SHIPMAN 10in. x 27in. Plain Grinding Machine.

B.S.A. Landle Type C 6in. x 18in. Plain Grinding Machine.

CHURCHILL 24in. Ring Grinder.

CHURCHILL 42in. Ring Grinder.

SCORVEN 2C Centrifugal Grinder.

HENDEY 24in. x 16in. S.S. & S.C. Lathe. Speed Range 14-560 r.p.m.

F.L.C.B. 17in. x 10ft. S.S. & S.C. Lathe. Speed Range 1,08-152 r.p.m.

OLDFIELD & SCHOFFIELD 15in. x 8ft. S.S. & S.C. Lathe. Gap Bed. Speed Range 6.5-332 r.p.m.

OLDFIELD & SCHOFFIELD 12in. x 7ft. S.S. & S.C. Lathe. Gap Bed. Speed Range 12-400 r.p.m.

MOWARCH 16in. x 20in. Type CY S.S. & S.C. Lathe. Speed Range 14-600 r.p.m.

CINCINNATI Type LT 8in. x 5ft. S.S. & S.C. Lathe. Speed Range 18-592 r.p.m.

LANG 9in. x 5ft. 6in. S.S. & S.C. Lathe. Speed Range 8.75-240 r.p.m.

DEAN SMITH & GRACE 7in. x 3ft. 6in. S.S. & S.C. Lathe. Gap Bed. Speed Range 11-490 r.p.m.

DEAN SMITH & GRACE 7in. x 2ft. 6in. S.S. & S.C. Lathe. Gap Bed. Speed Range 11-490 r.p.m.

DENHAM 6in. x 3ft. 0in. S.S. & S.C. Lathe. Gap Bed. Speed Range 10-460 r.p.m.

KITCHEN & WADE 5ft. No. 5 M.T. Radial Drilling Machine. Speed Range 20-1,000 r.p.m.

TOWN 3ft. No. 3 M.T. Radial Drilling Machine. Speed Range 128-1,450 r.p.m.

ARCHDALE 4ft. No. 4 M.T. Radial Drilling Machine. Speed Range 60-2,000 r.p.m.

ARCHDALE 3ft. No. 2 M.T. Radial Drilling Machine. Speed Range 128-1,440 r.p.m.

ASQUITH LDR 4ft. No. 3 M.T. Radial Drilling Machine. Speed Range 79-2,000 r.p.m.

CLIFTON & BAIRD Punching and Cropping Machine. Cap. 4in. x 4in. x 4in. angle.

BIOWOOD 4 Roll Bending and Straightening Machine. Cap. 4ft. x 4in.

Modern Machines—Motorised 400-440/3/50. Fully Overhauled—Six months' Guarantee.

WESTERN MACHINE TOOLS (SWANSEA) LTD.
72, MANSEL STREET, SWANSEA.
Tel.: 50061/2.

There are **HUNDREDS** of **MACHINES** to choose from at

THE F.J.E. MACHINE CENTRE

ISLINGTON PARK STREET, NEAR Highbury Corner, LONDON, N.1
(on the main A1 Road from the North)

Two Belliss & Morcom 2,500 c.f.m. Compressors, 100 lbs. w.p., 550 h.p. motors, 6,500/3/50 supply. Used 4 years only. With inter-aided coolers. Receiver, Switch panel. Available immediately.—FRED WATKINS (ENGINEERING) LTD., Coleford, Glos. Phone: Coleford 2271/2/3.

Churchill Hydraulic External Grinder. Model BY. Fitted Cam Grinding attachment. Mot.—WILCOX & CO., Barr Street, Birmingham, 19. NORTHERN 1234/5.

A Comprehensive Selection of Modern Machine Tools Always in Stock

WM. PARTINGTON LTD.
Trafford Park Rd.
Trafford Park
Manchester 17
TRAFFORD PARK 0332

Six Boley & Leinen ER15E
1 1/2 in. capacity Capstan Lathes, almost new and fully equipped. Reasonable price for quick sale.—BOX 2662, MACHINERY, Clifton House, Euston Road, N.W.1.

Brown & Sharpe Automatics:
Several No. OG, No. 2G and No. 00G. All late serial numbers and in good condition. Reasonable prices. M/C's complete with stock supports, feed and speed gears.—Can be seen at MELBOURNE ENGINEERING CO., LTD., Derby Road, Melbourne, Derbyshire. Phone: Melbourne 232.

Forty Yale "Blue Streak" Hand Lift Trucks, fitted with Hydraulic Load Check. Capacity 2,500 lbs. Rubber tread. Height in low position 9in. £17 10s. 0d. each. HULBERT'S, 19, Great Bridge, Tipton. Telephone: Tipton 2244.

100 Ton Friction Screw Press,
11in. between uprights, 6 1/2 in. dia. screw. £95.—BIRCH & JACQUES, Hershham Trading Estate, Walton-on-Thames.

A Good Number of High-class
Machine Tools always in Stock.—**ELLISON, Cook Street, off Chapel Street, Salford, 3, Lancs.**

Soag 1 1/2 in. Bar Capstan Lathe.
Power feed to saddle and turret, equipped. Motorised. Pallas H.O. Horizontal Mill with vertical head. Motorised. Bechler 10 m.m. Automatics, A type, 1949/50 machines.—**MAURER, LTD., Cambridge Yard, Hanwell, London, W.7.**

Expanding Lathe Mandrel Sets
Range 1/4 in. to 2 in. Leconte Pattern. List £17 5s. Ex Government Bargain. Unused. Bored. 16 10s. set, P.P. 3s. 6d. Also 2 in. to 3 in. 15 10s. carr. 5s.—**STEVENAGE TOOLS & SWITCHES, LTD., Stevenage, Herts.**

BUSTLED?



REMEMBER... WARD'S might have it!

THOS. W. WARD LTD
ALBION WORKS, SHEFFIELD

PEARSON

ELECTRO HYDRAULIC FLANGING PRESSES

Bulkhead Type up to 1,200 tons.
Plateshop Type 120 to 500 tons.

Robust all-welded construction incorporating the most modern developments.

PEARSON MACHINE TOOL CO., LTD., WALKER, NEWCASTLE UPON TYNE, 6
Telephone: Wallsend 64081.

For Custom-built Hydraulic
Rams of all types, especially for High Pressures, consult—**A. G. STONE (ENGINEERING) LTD., 104, Dogfield Street, Cardiff.**

When answering advertisements kindly mention **MACHINERY.**

In Stock NOW

AUTOMATICS

PONGRACZ Single Spindle Automatic capacity 10 mm.
CONOMATICS 3in. four-spindle Bar Automatics, (Three available.)
BULLARD 8in. six-spindle Vertical Chucking Automatic.

BORING MACHINES

RICHARDS Type PRT Horizontal Type Floor Boring Machine, 3 1/2in. dia. travelling spindle and 28in. dia. facing head.
FRORIEP Vertical Boring Mill, table diameter 39in., maximum turning capacity 52in. (1955.)
ASQUITH 7in. Horizontal Floor Boring Machine.
BERTHEZ Model 9340 Vertical Boring Mill, table diameter 7in. 10in., maximum turning capacity 9ft. 6in. (1953.)
JUNGENTHAL Model KE.1200 Vertical Boring Mill, table diameter 39in., maximum turning capacity 50in. (1954.)
NEWALL No. 1 Jig Boring Machine.
New PFEIFER Model F.60 Horizontal Universal Boring, Facing, Milling and Drilling Machine, 2 1/2in. travelling spindle.

CAPSTAN & CENTRE LATHES

BRADFORD 8 1/2in. centre height by 30in. between centres Centre Lathe.
HERBERT No. 8 Combination Turret Lathe.
HERBERT No. 12 Combination Turret Lathe with comprehensive tooling.
NILES Centre Lathes 15in. centre height by 28ft. between centres. (Two available.)
BETTS-BRIDGFORD Centre Lathe, 15in. centre height by 16ft. between centres. (Two available.)
WARD No. 7 Combination Turret Lathe.
GISHOLT Model IL Universal Turret Lathe. (Two available.)
LIBBY Model 4A Capstan Lathe.
OLDFIELD & SCHOFIELD Surfacing and Boring Lathe, 10 1/2in. centre height by 33in.

DRILLING MACHINES

KITCHEN & WADE 28V10 Single Spindle Vertical Drilling Machine, No. 4 M.T.
HETTNER Radial Drilling Machine, having 10ft. Radial Arm elevating column type.
KITCHEN & WADE 4ft. 6in. Radial Drilling Machine.
TOWN 30in. Vertical Spindle Boring, Drilling and Tapping Machine. No. 5 M.T.
ASQUITH ODI 6ft. Radial Drilling Machine.

GEAR MACHINES

MUIR 72in. spur and helical Gear Generating Machine.
KOLB Gear Grinding Machine.
GLEASON No. 9 Bevel Gear Completer Machine.
ORCUTT Model HM.24 Internal Spur Gear Grinding Machine.
SYKES V.10 Gear Generator.
GLEASON 3in. Bevel Gear Generators. (Two available.)

GRINDING MACHINES

New EXCEL No. 3 Hydraulic Surface Grinding Machine.
NORTON Universal Grinding Machine, Type "C", capacity 12in. by 36in.

CHURCHILL Universal Grinding Machine, 10in. by 24in. between centres.
B.S.A. LANDIS Type "C" Plain Hydraulic Cylindrical Grinding Machine, 6in. by 30in. (Two available.)
CHURCHILL Model HBY Internal Grinding Machine.
CHURCHILL Hydraulic Universal Grinding Machine, capacity 24in. by 84in.
BLANCHARD No. 10 Vertical Spindle Surface Grinding Machine.
LANDIS Hydraulic Universal Grinding Machine 14in. by 36in. between centres.
LANDIS Type D Hydraulic Crank Pin Grinding Machine, capacity 21in. by 72in.
LANDIS Type "C" Plain Hydraulic Cylindrical Grinding Machine, 10in. by 36in.
NORTON 6in. by 18in. Plain Cylindrical Grinding Machine.
ABWOOD Vertical Spindle Surface Grinding Machine, 6in. by 18in.
CHURCHILL Hydraulic Universal Grinding Machine, capacity 24in. by 72in.
New TOS Vertical Spindle Hydraulic Surface Grinding Machine, table 118in. by 24in.
New TOS Vertical Spindle Hydraulic Surface Grinding Machine, table 59in. by 12in.
New TOS Model BBZ.60 Centreless Grinding Machine, maximum capacity 2 1/2in. diameter.

MILLING MACHINES

MILWAUKEE No. 2H Vertical Milling Machine, table 50in. by 10in.
SUNDSTRAND Hydro-Screw Rigidmill Automatic Production Milling Machine, table 7in. by 14in., table traverse 48in.
MILWAUKEE No. 4H Plain Horizontal Milling Machine, table 74in. by 15 1/2in.
VICTOMATIC Automatic Cycle Production Milling Machine, capacity 50in. by 10in.
REED PRENTICE No. 5 Vertical Milling Machine, table 68in. by 16in.
CINCINNATI Hydromatic 3/24 Duplex Production Milling Machine. (Two available.)
REED PRENTICE No. 6 vertical Milling Machine, table 84in. by 20in.
CINCINNATI 1/12 Horizontal Production Milling Machine.
CENTEC Model 3R Automatic Production Milling Machine, table 6in. by 25in.
CINCINNATI 2M Universal Milling Machine.
REINECKER Vertical Milling Machine, table 51in. by 13 1/2in.
HERBERT No. 10 Vertical Milling Machine, table 31in. by 9 1/2in.

PLANING, SLOTTING AND SHAPING MACHINES

STOCKBRIDGE 20in. Shaping Machine.
URQUHART LINDSAY & ROBERTSON ORCHAR Spiral Drive Heavy Duty Planing Machine, capacity 16ft. by 5ft. by 5ft.
STIRK HILOPLANE Planing Machine, four solenoid tool boxes, capacity 12ft. by 4ft. by 4ft.

MISCELLANEOUS

BESCO Overcrank Guillotine, capacity 5ft. by 14 gauge (Motorised 400/350 cycles.)
SHEPBRIDGE 20in./22in. Hydraulic Cold Circular Sawing Machine.
BENNIE Punching, Cropping, Notching Machine, Punch 1 1/2in. through 1in.
ROWLAND 16in. Type AHC Hydraulic Abrasive Wheel Cutting-Off Machine.

Newman for MACHINE TOOLS


 RING

CHIPPING SODBURY 3311

or contact our nearest Representative

NEWMAN INDUSTRIES LIMITED

Machine Tool Division
 Telephone: Chipping Sodbury 3311

YATE, BRISTOL
 Telegrams: "Dynamo, Yate" /

London (Sloane 8206). Birmingham (Northern 9634). Manchester (Deansgate 2837 8). Glasgow (Central 2101/2).
 Newport, Mon. (Newport 64006). Leeds (Leeds 67.3.3). Lincoln (Lincoln 22675). Wallsend-on-Tyne (Wallsend 63992).

Classified Advertisements (PLANT FOR SALE, contd.)

CHURCHILL REDMAN 24in. SURFACING, BORING & SCREW CUTTING LATHE

Swing 38in. x 19in. in gap. 16 spindle speeds 14/408 r.p.m. Quick change gearbox for threads 3 to 46 T.P.I.

F.J. EDWARDS LTD.,
359-361 Euston Road,
London, N.W.1
EUSTON 4681 and 3771

No. 2 Kearns Standard Motor-
ised Hor. Boring and Facing Machine. Will face up to 30in. dia. 24 spindle speeds. Main table 48in. x 30in. Top table 36in. x 36in. Balanced head. Covered ways. Venerlier fitted. Facing head to outer steady 5ft. A.C. motor.—**LEE & HUNT, LTD.,** Crocus Street, Nottingham. Tel.: 84246.



JONES & SHIPMAN Model 540 Surface Grinder.

38in. Radial Sensitive Drilling Machine, ARCHDALE No. 3 M.T.

10 1/2in. x 4ft. Between Centres MITCHELL Centre Lathe.

No. 3 EXCEL Filing and Sawing Machine.

14in. BUTLER Slotting Machine, 39in. diameter table. 940 strokes per minute.

24in. x 9in. BUYER High-speed Vertical Milling Machine. Spindle speeds 265-1,860 r.p.m. As new.

27in. WOTAN Hydraulic Shaper. Automatic feeds and rapid traverses to the table. Ram speeds 16-98ft. per minute. Overhauled.

52in. x 10 1/2in. CINCINNATI Vertical Milling Machine. Model 2H. Power feeds and rapid traverses. Excellent condition.

10in. x 24in. NEWALL Type L.U. Universal Grinder. Hydraulic. Complete with internal spindle.

10in. x 24in. CHURCHILL Hydraulic Universal Grinder. Complete with internal spindle.

DIMCO (Gt. Britain) LTD.,

28, WOOD LANE,
SHEPHERD'S BUSH,
LONDON, W.12.
SHEpherd's Bush 4401.

WARD No. 7 Combination Turret Lathe—A.C. motor drive. Covered bed. With automatic ball chuck, bar feed, front and back toolpost.

HERBERT No. 95 Combination Turret Lathe. A.C. motor drive, 4 1/2in. H.S. Very well equipped with chucks, tool-holders, etc.

NOBLE & LUND 11/16 "Fluifaced" Cold Saw. Capacity 5in. diameter. A.C. motor drive.

ROSE

4/6, Minerva Road, Park Royal,
LONDON, N.W.10.
Telephone: ELGar 4841-4842.

A SELECTION FROM OUR STOCK OF MACHINE TOOLS

WARD 7C.T. Lathe, comprehensive equipment.

RICHARDS No. 5 Borer, with travelling spindle.

SNOW Grinders, horiz. spindle, OS54, OS72 and OS120.

HARRISON 11in. Swing Copying Lathe. (NEW.)

CRAYEN S2 Universal Rigidmill.

RICHMOND O3SD Universal Miller. (NEW.)

W. FORREST & CO. LTD.
INDUSTRY WORKS,
SYLVESTER GARDENS,
SHEFFIELD, I.

'Phone: 23314/5.

Schuler Rotary Trimming and Thread Rolling Machine for Canisters. 400/3/50. Capacity 4 1/2in. diameter x 5in. deep.—HICKS MACHINERY, LTD. 26, Addison Place, London, W.11. Tel.: PARK 2333.

MACHINE TOOLS—The Heart of Industry

NEW

H.M.V. Model AV-75 (Swedish) 3in. Universal Horiz. Borer.

BINS & BERRY Model "TB" 12 1/2in. h.c. x 7ft. 6in. b.c. S.S. & S.C. Gap Bed Lathe.

GRANOR 11in. h.c. x 7ft. 10in. b.c. S.S. & S.C. Gap Bed Lathe.

HARRISON 8in. h.c. x 6ft. 7in. b.c. S.S. & S.C. Gap Bed Lathe.

New STANLEY Sliding Bed, 10in. h.c. x 5ft. b.c. S.S. & S.C. Lathe.

W.M. 7 1/2in. h.c. x 36in. b.c. S.S. & S.C. Gap Bed Lathe.

ESSEBECO Model RD25 27in. Radial Arm Drill, No. 3 M.T., power feed.

RICHMOND HB3/12 48in. Radial Arm Drill, No. 4 M.T.

RICHMOND SR2 4ft. Radial Drill, No. 3 M.T.

ABWOOD CGI 8in. Carbide Tool Grinder.

ABWOOD Model TH/2AP Vertical Surface Grinder.

BURDETT 18in. x 6in. Hydraulic Surface Grinder.

EXCEL No. 5 Tool and Cutter Grinder, cap. 10in. x 26in.

VICTORIA U2 Universal Miller.

W.M. "369" Turret Miller.

WORCESTER 6-ton Open Fronted Press.

EXCEL No. 3 Filing and Sawing Machine.

HEAP Universal 2in. Whit. Screwing Machine.

INVICTA Model 6M 24in. Shaping.

IN ADDITION TO THE ABOVE WE HAVE 380 SECONDHAND MACHINE TOOLS IN STOCK.

All machines delivered free U.K. PRICED BROCHURE ON REQUEST

MARTIN BROS. (MACHINERY) LTD.,

EMPRESS WORKS, EMPRESS STREET
CORNBROOK, MANCHESTER, 16.

Tel.: Trafford Park 1091-2.

50 Ton Fielding Downstroke

Hydraulic Press, 3ft. stroke.

150 Ton Rhodes 18in. Stroke Double Sided Geared Power Press.

200 Ton Tangey Hydraulic Straightening Press, bed 25ft. by 3ft., stroke 21in., motorised travelling table, 3 ram pump.

100 Ton Bigwood Motorised Geared Beam Bender up to 12in. by 6in.

Scriven 3-Roll Plate Bending Machine, rollers 14ft. wide, 4in. capacity.

Archdale 4ft. Radial Drilling Machine.

Herbert Filing and Sawing Machine, 15in. square, adjustable table.

Alexander 16in. Cutting-off Machine.

Herbert Hacksaw, 13in. blade, belt driven.

Wicksteed Hacksaw, 16in. blade, 6in. by 6in.

Rex Hacksaw, 18in. blade, 8in. by 8in.

Colechester 7in. Centre Lathe, 7ft. gap bed.

Herbert Horizontal Milling Machine, 3ND table 61in. by 15in., 4 spindle speeds.

3,000 kg. Capacity Avery Hardness Testing Machines, 10in. dia. table (2).

50 Ton Inclined Geared Open Press.

Crow Harvey Punch, Shears and Angle Cropper, 18in. blade, 27in. throat, heavy duty.

Pels Punch, Shears and Cropper, 12in. blade, shear 4in., takes 6in. by 6in. by 4in. angles.

Craig & Donald Billet Shears, 8in. blade, 6in. by 1in. capacity.

Robertson Shears, 4in. capacity, 10 h.p., 28in. blade, 9in. maximum opening (2).

Robertson 7-roller Plate Flatteners, 8ft. 6in. wide, approximately 4in. capacity.

Sedgwick 6ft. Folding and Bending Machine.

Landis Pipe Screwing Machine up to 12in. bore, also 2in. machine.

Berry 3-roller Plate Bender, 7ft. wide, approximately 4in. capacity.

Sweeney Pig Presses, all sizes, 20 available.

New 1-cwt. and 2-cwt. Hammers by Massey and Alldays & Onions, also 3/5 cwt. secondhand.

Oliver Planishing Hammer, 29in. g.p.

E.O.T. Cranes.

60/5 ton Clyde Goliath, 40ft. span, unused.

40/5 ton Babcock Goliath, 40ft. span, unused.

40/5 ton Adamson, 42ft. 3in. span, almost new.

40 ton Clyde, 42ft. 3in. span, still packed.

30/5 ton Adamson, 42ft. 3in. span, almost new.

40 ton Vaughan, 42ft. 3in. span, almost new.

20/6 ton Vaughan, 42ft. 3in. span, cab type (6).

FRED WATKINS (ENGINEERING), LTD.
Coleford, Glos. 'Phone: Coleford 2271 (3 lines)

Browett & Lindley 2-st:ge Air

Compressor. Size M3. Output 300 c.f.m. at 100 lb. p.s.i. 7 1/2 h.p. motor and starter, 400/3/50. Inter and after coolers and non-return valve fittings.—PHONE BYFLEET 3252.

For Sale, Rotary Drying Machine

(Sturtevant) suitable for small metal parts with hopper feed and discharge chute. £100.

A.L.D. Compressor Petrol Driven, 7 cu. ft. cap. £30.

4 Rubber Lined M.S. Tanks, 6ft. 6in. by 3ft. by 15in. deep. £7 each.

BOX Z678, MACHINERY, Clifton House, Euston Road, N.W.1.

Sciaky Type RAMC 2/40 Circum-

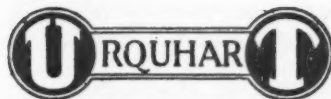
ferential or End Seam Pneumatic Welding Machine for sale. Specially suitable for welding the ends of cylinders or drums and for straight runs. Pneumatic electrode pressure. Bottom electrode wheel driven in either direction with variable speed chain drive. Nominal rating 40 K.v.a. Capacity two thicknesses of 18 s.w.g. Welding speed from 2 to 9ft. per minute. Depth of throat 14 1/2in.—Photo, etc., from P. J. EDWARDS, LIMITED, 359-361, Euston Road, London, N.W.1, or 41, Water Street, Birmingham, 3.

Milwaukee 1H12 Manufacturing

Miller. A.G.H. Table 28in. x 12 1/2in. Mot.—WILCOX & CO., Barr Street, Birmingham 19. Northern 1234/5.

When answering advertisements kindly mention MACHINERY.

Classified Advertisements (PLANT FOR SALE, contd.)



NEW MACHINES EX STOCK FOR IMMEDIATE DELIVERY

COLCHESTER Lathes, Mascot, 8in. by 60in.
TRIUMPH 7 1/2in. by 48in.
STUDENT 6in. by 24in.

CHIPMASTER 5in. by 24in.
"ACE" Bench Lathe, 4 1/2in. centres by 23in.

between. Norton feed box and on cabinet stand. 415/3/50.
ROBLING Lathe, Model 600/2, 5 1/2in. centres by 24in. between, 1,920 r.p.m. accuracy 0.0002in. 415/3/50 A.C.

FEIFFER Precision Toolroom Lathe. Model P.12, 9in. centres by 44in. between, 1,000 r.p.m. Norton feed box, 187 threads Whitworth, metric and module, turning accuracy 0.002mm., 415/3/50 A.C.

TROGLIA Lathe. Model TPM20, 10 1/2in. centres by 76in. between 31in. in gap, 850 r.p.m., Norton feed box. Whitworth, metric and module. 415/3/50 A.C.

GRANVILLE SENIOR 8 1/2in./4in. H.D. Bench Centre Lathe 21in. b.c. Motorised.

ASTRA 6in. Stroke slotting Machine, 4 speeds to ram, compound table. Mot. 415/3/50.

SENIOR M.1. Horizontal Milling Machine. Table 25in. by 6 1/2in. W/S. longt. power feed, spindle speeds 12, 50/1,650 r.p.m., coolant pump. Motorised 415/3/50.

P.T.V. Universal Mill. Model 51. Table 33 1/2in. by 8 1/2in., power feed, 60/1,200. Dividing heads, etc. 415/3/50.

P.T.V. Vertical Mill. Model IV. Table 39in. by 8 1/2in., power feed all directions, swivel head rise and fall, speeds 60/1,400, dial change. 415/3/50.

ASTRA Vertical Mill. Table 23in. by 8in., hand feeds to table in all directions. No. 8 Morse spindle. Motorised 415/3/50.

FIVE STAR Tool and Cutter Grinder, capacity 5in. by 12 1/2in. with motorised workhead for external and internal grinding. 415/3/50.

PLEASE ADDRESS YOUR ENQUIRIES TO
DEPARTMENT "P."

WILLIAM URQUHART
1023-1027 Garratt Lane, London, S.W.17

'Phone: WIMbledon 6341

Thread Milling Machine.
Matterson No. 11. All-electric. £125.-
BOX 7721, MACHINERY, Clifton House, Euston Road, N.W.1.

Gang Slitting Machine For Sale.

With separate strip coiling unit. Capacity 14 s.w.g. Width between housings 20in. Diameter of cutter shaft 3in. Two pairs of cutters. Motor drive 400/3/50.-F. J. EDWARDS LIMITED, 359, Euston Road, London, N.W.1. or 41, Water Street, Birmingham, 3.

LEONARD ROTH

ABBOT ST., KINGSLAND HIGH ST.,
DALSTON JUNCTION, LONDON, E.8.

TERMS ARRANGED

Tel.: CLIssold 0513/4

WARD 2A Capstan for Collet Operation, 400/3/50. £195.

WARD No. 7 Capstan, 400/3/50 Motor. £125.

SOUTHWARK No. 2 Capstan for Collet and Chucking Operation, complete with 21 Collets, 3 jaw chuck, suds pump, etc., 400/3/50. £125.

MBCOL No. 3 Horizontal Mill, 15 1/2in. x 4 1/2in. table, 8 speeds, 400/3/50. £95.

WE HOLD BIG STOCKS OF LATHES, SHAPERS, MILLS, DRILLS, PRESSES, ETC. PLEASE WRITE FOR LISTS.



One Newall No. 1

Jig Borer to the following brief specification.

TABLE: 36in. by 24in.

SPINDLE NOSE TO TABLE: 32in.

QUILL MOVEMENT: 9in.

Fully rebuilt and guaranteed.

Supplied with complete electrical equipment including control cabinet and motors suitable for 400 volts 50 cycles 3 phase

THE
NEWALL
USED MACHINE DIVISION
OUNDL ROAD
ORTON LONGUEVILLE,
PETERBOROUGH
Telephone: 6116

Hydraulic Press, 12 Tons Capacity. Drummond Electraulic Model ABN12 - BOX 2807, MACHINERY, Clifton House, Euston Road, N.W.1.



New & Used Machine Tools

COLCHESTER TRIUMPH Centre

Lathe, fully equipped.

COLCHESTER MASTER Centre Lathe.

ALBA 25 Shaper.

DENBIGH C4 Horizontal Mill with

equipment.

CINCINNATI No. 2 Tool and Cutter

Grinder. Mot. 400/3/50.

DENHAM Heavy Duty A.G.H. Gap bed

Centre Lathe. 11in. centre height.

9ft. 6in. between, 44in. swing in gap.

4 1/2in. H.M. Motorised 400/3/50.

BROWN & SHARPE No. 13 Universal

and Tool Grinder.

ELECTRISKA 1 1/2in. cap. Geared 27in.

Column Drilling Machine. (New.)

BLISS No. 20 Power Press, 1 1/2in. stroke.

NORTON Hori. Spindle Surface Grinder,

36in. table with 24in. by 8in. mag. chuck.

ARCHDALE 14in. Horizontal Mill, 26in.

by 8in. table, 3 available.

PALLAS HO Horizontal Mill, 30 by 7 table.

Motorised 400/3/50.

STRAIGHT & VINES LTD.
MINT STREET, BOROUGH,
LONDON, S.E.1.
Telephone: HOP 4364.

TATE

AUTOMATICS

Four **MANURHIN** Type GD.35 Second operation Hopper Feed Automatics (unused and in original crates).
ACME GRIDLEY 4 Spindle Auto, 3in. £125

HORIZONTAL BORING

DICKINSON 3in. Travelling Spindle Horizontal Borer, No. 5 M.T. 45in. by 28in. main table, 10 h.p. motor for 400-440 volts 3 phase 50 cycles A.C. supply £595

LATHES

WARD, HAGGAS & SMITH 60in. Surfacing and Boring Lathe. (Good condition.)

COLCHESTER 6 1/2in. Master (2 machines).

COLCHESTER 7in. Triumph.

LANG 10in. by 3ft. 6in. S.S. & S.C., 10 h.p.

HARRISON 7in. S.S. & S.C. £225

MITCHELL 6 1/2in. S.S. & S.C. (1952).

WILLSON 7 1/2in.

GRINDING MACHINES

JONES SHIPMAN Fig. 1204 EIUR 8in.

by 22in. Universal (nearly new).

JONES SHIPMAN Fig. 138 10in. by 27in.

Universal (1948).

MYFORD MG9 5in. by 9in. Internal-External.

Two **LUMSDEN** 70 LEOD Vertical Surface, 48in. by 12in., with chuck, etc.

From £850

MILLING MACHINES

VAN NORMAN No. 2 Horizontal and

Vertical Milling Machine, 44in. x 10in.

VICTORIA U.3 Universal 50in. by 12in.

with power feeds and rap d traverses and

Vertical Head (very good condition).

COCHRANE & BLY No. 14 Universal

Vertical Miller Shaper.

VICTORIA UO Mill (new).

CINCINNATI 4/36 Hydromatic Serial

40091. Excellent condition.

ARCHDALE 24in. Production, with Auto-

cycle (1946).

CINCINNATI 30in. by 8in. Plain.

WADKIN LXA 36in. by 12in. Vertical.

PALLAS Model HO Plain, 30in. by 8in.

Two **SENIOR** Model MI Plain Mills (new).

SMITH & COVENTRY 72in. by 15in.

Heavy Duty Vertical (very low price).

EDGWICK 40in. by 10in. Horizontal.

DRILLING MACHINES

CORONA Model IAX Sensitive Box

Column Drilling Machine, No. 1 M.T.

HERBERT Type V 1 1/2in. 2-spindle Drilling

Machine. 3 M.T.

SHEET METAL

BROOKES 8ft. by 3in. Bending and

Folding Machine.

BESCO Type F Size No. 8 4ft. Slip Bending

Rolls.

HANDY 1in. Bar Cropping Machine. £10

HANDY 1in. Bar Bending Machine. £10

BESCO Type SH 42in. Hand Lever Shear.

£75

TATE MACHINE TOOL CO. LTD.,

6, NORTH END PARADE
OPPOSITE OLYMPIA,
LONDON, W.14.

Fulham 6563/4/5.

When answering advertisements kindly mention MACHINERY.

Classified Advertisements (PLANT FOR SALE, contd.)

HARRY KIRK

can recommend the following modern quality machines from STOCK:

SCRIVENER No. 2 Centreless Grinding Machine with control cycle.
CHURCHILL Model RBY 24in. Rotary Surface Grinding Machine.
KEARNS No. 2 HORIZONTAL BORING, MILLING, DRILLING AND FACING MACHINE, 3in. sliding spindle, 30in. dia facing cap. Size of top table 45in. by 48in.
SWIFT 4ft. RADIAL DRILLING MACHINE. Elevating arm, box table.
HERBERT No. 4 Automatic Chucking Lathe.
PARKINSON No. 3J UNIVERSAL MILLING MACHINE.
PRATT & WHITNEY 12in. STROKE SLOTTING MACHINE. Tilting ram.
MODERN OPTICAL PROFILE GRINDING MACHINE.
LANG JUNIOR CENTRE LATHE. Capacity 6 1/2in. centre height by 30in. between centres.
CHURCHILL-REDMAN HEAVY DUTY SHAPING MACHINE. 24in. stroke, swivelling vice, 10 h.p. motor.
BUTLER 8in. STROKE SLOTTING MACHINE, with tilting table.
B.S.A. 9in. SINGLE SPINDLE CHUCKING AUTOMATIC. Complete with air-operated chuck.
KITCHEN & WADE VERTICAL FINE BORING MACHINE. 14in. stroke. Compound table.
KITCHEN & WADE HEAVY DUTY PILLAR DRILL. No. 5 Morse. Speeds 22-1,000 r.p.m.
CHURCHILL 12in. by 36in. UNIVERSAL HYDRAULIC GRINDING MACHINE.
COLLET & ENGLEHARDT HORIZONTAL BORING, MILLING AND DRILLING MACHINE. 3in. Sliding Spindle, size of top table 35in. x 43in.
COLLET & ENGLEHARDT HORIZONTAL BORING, MILLING AND DRILLING MACHINE. 3 1/2in. Sliding spindle, size of top table 47in. x 40in.
KEARNS O.B. HORIZONTAL MILLING, DRILLING AND TAPPING MACHINE. 2 1/2in. dia. Sliding spindle, size of top table 30in. x 36in.
KEARNS O.A. HORIZONTAL MILLING, DRILLING AND TAPPING MACHINE. 2 1/2in. dia. Sliding spindle, size of top table 24in. x 33in.
ASQUITH O.D. 5ft. RADIAL DRILLING MACHINE.
HARVEY HEAVY DUTY ROLL TURNING LATHE. 72in. swing by 30ft. between centres. S.C.M.D. 80 h.p.

Further details from

**HARRY KIRK
ENGINEERING LTD.**

BRANDON ROAD WORKS, BRANDON ROAD, COVENTRY.

Phone: WALSGRAVE-ON-SOWE 2213/4.

Jones & Shipman No. 310 motorised Universal Tool and Cutter Grinding Machine. Cap. 8in. x 16in. 1 h.p. 400/3/50 motor - LEE & HUNT, LTD., Crocus Street, Nottingham. Tel.: 84246.

TWO B.S.A. 9in. Chucking Automatics. Each with front and rear toolposts. 9in. Coventry air chuck, combination toolholders, pick-off gears, etc. Spindle speeds 23 to 945 r.p.m. Motor drive 415/3/50.

Robinson

4/6, Minerva Road, Park Royal,
LONDON, N.W.10.
Telephone: ELGar 4841-4842.

THE SPOT TO WATCH!

FOR GOOD CLASS SECOND-HAND MACHINES AT LOW COST

C.V.A. No. 20 Automatic.
B.S.A. 1in. Automatics.
INDEX ON 12 Automatics.
PETERMAN 7 m.m. Automatics.
WARD 1A, 2A Capstans.
GISHOLT No. 4 Capstan.
WARNER & SWASEY No. 2 and No. 5 Capstan.
CARL UNGER Universal Grinder.
PALLAS No. 2 Surface Grinder.
NORTON 18in. x 6in. Surface Grinder.
CHURCHILL 'HDY' Internal Grinder.
HEALD 72A Internal Grinder.
WOTAN Internal Grinder.
LANDIS Cutter Grinder.
JACKMAN Ds. Grinders, horizontal 48in. and 24in.
PRECIMAX 10in. x 48in. Plain Grinder.
MAXIMOVA Profilmatic type 'V' Copying Lathe.
HOLBROOK Model 'C', No. 10 S.S. & S.C. Lathe.
HOLBROOK 8in. x 36in. S.S. & S.C. Lathe.

KARGER 5in. x 24in. S.S. & S.C. Lathe.
GISHOLT No. 5 Turret Lathe.
CINCINNATI 3/36 Hydromatic Duplex Mill.
WADKIN Vertical Mill, 2,100 to 3,100 r.p.m.
CINCINNATI No. 4 Vertical Mill.
ADCOCK & SHIPLEY No. 3 Horizontal Mill.
CINCINNATI Hydrotel Mod. EM. 28in. Vert. Mill.
EDGWICK No. 1 Speedmill.
WERNER type 2201 Plain Mill.
DENBIGH Universal Mill.
VICTORIA Horiz. Mill.
MANN Horiz. Mill type 4102.
VULCAN Mark 1 Routing Machine.
E.H.J. Tapping Machine.
THIEL Tapping Machines.
 Variable Speed 'H' Gear Drives 3 h.p.
 All machines motorised 400/3/50 unless otherwise stated.

Phone:
EDGWARE
4488/9

E.H. JONES
(MACHINE TOOLS) LTD

Phone:
B'ham. Midland
5593

48 HIGH STREET, EDGWARE, MIDDX.

G. M. BUCKINGHAM LTD.

AS NEW MACHINE TOOLS
OF SPECIAL INTEREST

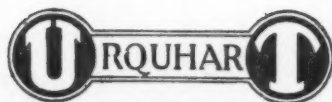
PLEASE NOTE PRICES

- 1—**GRANOR** 15in. by 60in. S.S. & S.C. Lathe, complete with equipment, little used and under two years old (cost nearly £3,000). **£1,850.**
- 1—**JONES & SHIPMAN** Model 540 Hydraulic Surface Grinder 18in. by 6in., 1954 machine, complete with £400 worth of extra equipment. **£550.**
- 1—**CARDIFF** 8 1/2in. by 48in. S.S. & S.C. Lathe, 1955 machine, with equipment. **£850.**
- 1—**HERBERT** No. 2 Carbimil 40in. by 12in. table, suitable for really heavy production work, 1950 machine, hardly used, with standard equipment. **£475.**
- 1—**WARD** 2A Capstan, power saddle, two-speed motor, over-size spindle, equipped as required, 1951 machine. **£375.**
- 1—**RICHMOND** SR2 Radial Drill 1 1/2in. capacity, 48in. arm with power elevation and coolant. 1958 machine used for one week only (new price £720). **£675.**
- 1—**INVICTA** 6MR 24in. Shaper, 1954 machine, showroom condition. **£450.**

8, Clarendon Avenue, Leamington Spa. Telephone 1215.

When answering advertisements kindly mention MACHINERY.

Classified Advertisements (PLANT FOR SALE, contd.)



USED LATE TYPE MACHINES

LATHES

LANG Late Type 8in. centre by 54in., in gap 28in. Norton Feed Box. Camlock Noe, heavy duty, motorised.
SELECTA A.G.H. 6in. centre by 42in., gap 23in., Norton feed box, motorised.
WILSON 7in. by 40in. gap bed, motorised.
BERRY A.G.H. 6in. centre by 32in., in gap 26in., motorised.
MITCHELL 7in. by 42in. by 25in. gap, A.G.H., motorised.
CHURCHILL CUB Lathe, 6in. by 24in., A.G.H., motorised 415/3/50.

CAPSTANS AND AUTOS

HERBERT 2D, bar feed, dead length chuck, motorised.
WICKMAN Auto, cap. 10mm., motorised.
WARD 2A, A.G.H. bar feed, motorised.
WARD No. 7, A.G.H. Bar feed, ball chuck, etc., motorised.
WARD 1A Capstans, 1in. collet cap., H.S. range up to 4,130 r.p.m. Ball chuck, bar feed, mot., coolant pump, 400-440/3/50 A.C.
HERBERT 18 Capstans, 1in. collet cap. Draw-in collet and bar feed, 16 speeds 18/4,020 r.p.m. Hand feed turret and cross slide. Mot. coolant pump, 415/3/50.
HERBERT No. 0 Capstans, 4in. cap. Dead length air chucks, 12 speeds 93/6,000 r.p.m., mot. coolant pump, 415/3/50.
BOLEY & LEINEN Precision Capstan. Model S.R.26. Collet cap. 1in., mot. 415/3/50.

MILLING MACHINES

WADKIN High-speed Vert. Mill, table 12in. by 36in., mot. 415/3/50.
LEINHARD Engraver, ratio 0-0 to 20-1, mot. **ARCHDALE** 28in., table 49in. by 13in., mot. in base.
ARCHDALE 20in. Horizontal. Table 40in. by 10in. Dial type speed change 30 to 615 r.p.m. Dial feed. Mot. 415/3/50.
ARCHDALE 18in. High-speed Vertical WB30. Table 34in. by 10in., 6 speeds 500/2,000 r.p.m. Mot. 415/3/50.

GRINDING MACHINES

CHURCHILL No. 2 Centreless. New, unused. Bargain price.
ABRASIVE Surface, No. 3, motorised, 24in. by 8in.
CHURCHILL Hyd. Vert. Surface (plough), cap. 18in. by 36in., segmental wheel 18in. dia. Humphrey mag. chuck, 12in. by 36in., mot. 415/3/50.
LANDIS Hydraulic Cylindrical Grinder, 12in. by 48in., mot., reconditioned.
NEWAL Hydraulic Cylindrical Grinder, 12in. by 24in., mot.
K.S. Internal Grinder, 4in. to 14in. dia., int. cap. Power feed to table, auto. sizing feeds, mot. 415/3/50. Late type machine, ex. con.
OLIVETTI Automatic Hydraulic Cylindrical Grinder. Type R4/1200. 14in. swing by 38in. between centres. Plunge cut. Mot. 415/3/50.

SHAPING MACHINES

ALBA 24in., motorised.
BERRY 14in. Shaper, gearbox drive, mot.
PRATT & WHITNEY Slotter, 5 1/2in. stroke, tilting ram.

PRESSES AND SHEET METAL, ETC.

RHODES Stagger Press, 25 ton, throat 24in.
OLIVER Quick Work Shear, cap. 4in., throat 30in.
RHODES Pluifed Hydraulic Guillotine, 6ft. by 14ft. Gauge. Micro stops.
THERMIC Muffle Furnace, 15in. by 24in. by 12in., gas heated pyrometer 1,000 deg. C.
T. & C. B.11 and B2, motorised.
RHODES 40 ton, inc., motorised.
BLISS No. 8, late type, motorised. £100.

DRILLING MACHINES

ASQUITH Radial OD1, 4ft. 6in., motorised.
ASQUITH Radial LDR 3ft. 6in., motorised.
PROGRESS Pillar 4E, motorised.

WILLIAM URQUHART

Head Office:—
 1023, Garratt Lane, Tooting, S.W.17

Showrooms:—
 Ace Works, Plough Lane, Tooting, S.W.17
 Phone: WIMBLEDON 6341

C. & G. OLDFIELD LTD.

NEW AND USED MACHINE TOOLS.

DRILLING MACHINES

KITCHEN & WADE 2in. Capacity, 4ft. 6in. Rad. E26 Radial (new), 14in. Capacity 40in. Rad. T7 Radial (new), 24in. Capacity Vertical V11, compound table (new), 1in. Capacity Vertical V20 (new).
KERRY 1 1/2in. Capacity Vertical. Power feed (new).
PROGRESS 1 1/2in. Capacity Vertical. Power feed (new).
HERBERT 2 Spindle, 11in. between spindles. No. 2 Morse. 0.75 h.p. each spindle. Excellent condition.

BORING MACHINES

HARVEY 24in. Horizontal Boring and Facing Machine. Swivel table 24in. x 24in.
KEARNEY No. 3 Horizontal Boring and Facing Machine. Live spindle. Serial No. 934.

GRINDERS

BRYANT Internal 16/38, also 24/26.
PRECIMAX 5in. x 18in. Plain Cylindrical M.P.O.
SNOW P24 Horizontal Surface. Hydraulic table and magnetic chuck.
SNOW VA12 Vertical Surface, 12in. segmental wheel.

LATHES

WARD 4 off No. 3A Chuck Models, 2 off No. 2A. 2 off No. 7 Covered Bed.
STANLEY 8 1/2in. and 10 1/2in. S.S. & S.C. Motorised (new).

MONARCH S.S. & S.C. 8in. height of centres, 2ft. 6in. between centres, 8 spindle speeds 16-420. Motorised.

MILLING MACHINES

KEARNEY & TRECKER "Milwaukee" Universal Model 20E Table 52in. x 12in. New.
CINCINNATI No. 2 Vertical Dial Type. Speed 20-500 r.p.m. Completely reconditioned and with usual 6 months guarantee.
ARCHDALE Plain Horizontal. Table 48in. x 12in.
CINCINNATI Plain Hydromatic. Serial No. A4003-10. Table 14in. x 52in. Spindle speeds 27-200 r.p.m.

PRESSES

RHODES No. 21 Non-Inclined Power Press, 5 h.p. A.C. motor. New.
 Two off **SCHULER** 0 Ton Punch Power Presses, 4in. stroke. Table 13 1/2in. x 13 1/2in. Motorised.
CRAIG & DONALD 120 Ton Press Brake. Cap. 10ft. x 4in. New 1956.
SLOTING AND SHAPING MACHINES
ORMEROD 8in. Stroke High Speed Slotter. New.
ORMEROD 18in. Heavy Duty Shaping Machine. New.

HACKSAWING MACHINES

RAPIDOR & QUALTERS & SMITH
 —All sizes from 6in. to 12in. New.

For further details apply to:—

C. & G. OLDFIELD LTD.
15, ABERCORN STREET, PAISLEY.

Tel.: PAisley 4285 (3 lines).

We have many first class Machine Tools in stock with

SINGLE PHASE ELECTRICS
 LATHES, DRILLS, SHAPERS, MILLING MACHINES, POWER HACKSAWS, D. E. GRINDERS

STRAIGHT & VINES LTD.

Mint Street, Borough, London, S.E.1.
 Telephone: HOP. 4364

Boley 10-Spindle Tapping and

Drilling Machine, mot., variable speed, 4in. cap. Also Natico 16 spindle Drill, No. 1 M.T. Mot.—C. L. THOMAS, LTD., 18, Park Avenue Solihull 1281.

Several Herbert 2S Capstans,

14in. capacity, from £150 ex works.—
 BOX Z682, MACHINERY, Clifton House, Euston Road, N.W.1.

Cincinnati 2 M.H. Plain Hor'

Milling Machine, in excellent condition; accept reasonable offer.—BOX Z697, MACHINERY Clifton House, Euston Road, N.W.1.

6-Station and 8-Station Section

Rolling Machines with Separate Curving Units for sale. Have been used in the manufacture of motor cycle wheel rims, and are complete with rollers. The curving unit is driven from the main machines. Width between roller housings 19in. and 12in. Diameter of shafts 3in. Length of bed 14ft. Weight approximately 13 tons and 12 tons. Motor drive from 30 h.p. motor suitable for 400-440 volts, 3 phase, 50 cycles.—Full details and photo, etc., from F. J. EDWARDS LIMITED, 356, Euston Road, London, N.W.1. or 41, Water Street, Birmingham, 3.

Norton Type "C" 10in. by 20in.

Plain Cylindrical Grinder, hydraulic table traverse, variable speed workhead, self-contained machine, 400/3/50, in good condition. £200.—E. SMITH (MACHINE TOOLS), LTD., 76, St. Lukes Road, Birmingham, 5. Tel.: CALthorpe 3761.

GLASS 9 1/2in. x 10ft. 6in. S.S. & S.C. Gap Bed Lathes. All-gear self-contained motor drive 220/380 volts, 3 phase, 50. Admits 6ft. 6in. b.c., 2 1/2in. H.S. Swing in gap 30in. dia. Q.C.G.B. for English and Metric threads.

CHURCHILL-REDMAN 7in. x 6ft. 6in. S.S. & S.C. Gap Bed Lathe. All-gear head clutch operated, with 400 volts, 3 phase, 50 cycles motor. Admits 3ft. 6in. b.c., 1 1/2in. H.S. Swing in gap 26in. dia. Semi-quick change gearbox and change wheels for English and Metric threads.

HENDEY 6in. x 5ft. S.S. & S.C. Toolroom Lathe. All-gear head, motorised 415/3/50, with "inching" control. Admits 27in. b.c., 1in. H.S. Norton Q.C.G.B.

Rothney

4/6, Minerva Road, Park Royal,
 LONDON, N.W.10.

Telephone: ELGar 4841-4842.

When answering advertisements kindly mention MACHINERY.

Classified Advertisements (PLANT FOR SALE, contd.)

MACHINE TOOLS

SELECTIONS FROM LARGE STOCKS

KEARNS 08 Horizontal Borer.
FEORIEP 48in. Vertical Borer, side head.
PENSOITI 36in. Vertical Borer, side head.
BROWN & SHARPE No. 2 Vertical Miller.
CINCINNATI No. 2 Vertical Miller, dial type.
ARCHDALE 12in., 18in., 24in. and 30in. Vertical Millers.
CINCINNATI 08 Auto Cycle Millers
KENT OWEN 1-14 Miller.
ARCHDALE 28in. Horizontal Miller.
RICHMOND 08 Universal Miller, 38in. by 9in.
EDGWICK No. 2 Simpmill, 37in. by 12in.

CLEVELAND 24in. Automation.
HERBERT No. 5 Auto, 18in. by 34in.
CONOMATIO 4in. 4-spindle Automatic.

ASQUITH 5ft. Radial Drill.
KITCHEN & WADE 4ft. 6in. Radial Drill.
ARCHDALE "O" Multi Drill.
POLLARD 12X Multi Drill.
HERBERT Type V Drill.
POLLARD 4-spindle Sensitive Drill.
JONES & SHIPMAN 4in. Tapping Machines.
HULLER No. 3 Radial Tapper.

ORMEROD 26in. Slotter
BETTS 12in. Slotter.

OSTER 6in. Screwing Machine.

SNOW NC14 Face Grinder, 12ft. stroke.
HEALD 72 spindle Duplex Internal Grinder.
CHURCHILL HBB Automatic Internal Grinder.
CHURCHILL 8in. by 16in. Semi-Universal Grinder.

CHURCHILL 10in. by 24in. Universal Grinder.
CHURCHILL 12in. by 36in. Universal Grinder.
BROWN & SHARPE No. 2 Surface Grinder.
SNOW 24in. by 8in. Surface Grinder.
SNOW T.20 and T.14 Table Surface Grinders.
GARDNER 50in. Disc Grinder.
NEW OLIVETTI 134in. Swing by 48in. Cylindrical Grinders.

CHURCHILL 18in. by 6in. Plain Grinder.
MULTIMAT 74in. Capacity Centreless Grinder.
LANDIS 12in. by 32in. Crankshaft Grinder.

NEWALL 10in. by 48in. Model L.A. Hydraulic Cylindrical Grinders.
VAN NORMAN 16in. Raceway Grinders.

New **MITCHELL** 164in. Lathe, 17ft. 6in. between centres.

New **MITCHELL** 144in. Lathe, 9ft. 9in. between centres.

COLCHESTER Mascot 84in. Gap Bed Lathes.

HENDEY 14in. by 30in. Lathes.

WILLSON 74in. by 6ft. Gap Bed Lathes.

WARD No. 7 Capstan Lathe.

WARD 2A Capstans.

BARDONS & OLIVER No. 5 Capstan.

HERBERT 5B Capstan.

LIBBY 4A Capstan, bar feed, 24in.

HERBERT 2B Capstan, bar feed, 14in.

WARD No. 7 Combination Turret Lathe.

HEYLIGENSTADT 48in. Surfacing and Boring Lathe.

CHURCHILL REDMAN 24in. Surfacing and Boring Lathe.

ALEXANDER Broaching Machine, 40in. stroke.

SYKES V10 Gear Generators, 0in.-14in. capacity.

CHURCHILL Cleveland 6in. Rigid Hobber.

NOBLE & LUND 54in./60in. Sawing Machines.

CLIFTON & WADDELL 15in. Sawing Machine.

Inspect under ideal conditions at

THE F.J.E. MACHINE CENTRE,

ISLINGTON PARK STREET,

Nr. HIGHBURY CORNER, LONDON, N.1.

F. J. EDWARDS LTD.,

359-361, EUSTON RD., LONDON, N.W.1

Telephone: EUSTON 4681-3771.

And at Lansdowns House, 41, Water St.
 Birmingham, 3. Telephone: Central 7606-8.

K·E·N·T

Lumsden No. 83 Heavy Duty Horizontal Surface Grinder. Capacity 84in. x 24in. 31in. segmental wheel. Hydraulic. £625.
G. & L. "Gran Rapids" No. 25 Hor. Hyd. Surface Grinder. £275.
Brown & Sharpe 2a Universal High Speed Milling Machine. £625.
Van Norman 22L Duplex Hor and Vert. High Speed Milling Machine. £625.
Zbrojovka 47in. x 12in. Vert. Mill. Sliding and swivel head. Rapid. £475.
Herbert No. 1 Lever Hor. Milling Machine. £75.
Cincinnati 08 Vert. Milling Machine. £225.
Archdale 18in. High Speed Vert. Milling Machine. £375.
Fifteen Ward 2A and 3A Capstans, from £125.
Holbrook 84 S.S. & S.C. Lathe. T.T. collets. £325.
Smith & Mills 16in. Heavy Duty High Speed Sharer. £275.
Southbend 5in. S.S. & S.C. Lathe. Full equipment. As new. £150.
Lang 84in. S.S. & S.C. Lathe. £625.
Asquith Precision Jig Boring and Drilling Machine. 3ft. 6in. x 2ft. 6in. Compound table. £350.
Bliss No. 20 Power Press, 2in. stroke. £112.
 Double Action Double Sided Geared Cam Drawing Press, 10in. combined stroke, approx. 40 tons. £175.

All machines mot. 400-440/3/50.

K·E·N·T MACHINERY & ENGINEERING CO.

Datchelor Place, London, S.E.5.

Telephone: ROD 4149.

Wickman 5-Spindle Auto. 14in. capacity, 1947 machine. Inspection welcomed.—BOX Z720, MACHINERY, Clifton House, Euston Road, N.W.1.

Wadkin Semi-automatic Pattern Miller. Type WF. Motorised 400-440/3/50. With tools and cutters. First class condition.—F. J. EDWARDS LIMITED, 359, Euston Road, London, N.W.1. Euston 4681; or 41, Water Street, Birmingham, 3. Central 7606.

One Reconditioned Sciaky Type P.M.O. Air Operated Spot Welder, with 24in. arm reach and suitable for connection to 400 v. 50 cycle, single phase A.C. mains (connected across outers of a three-phase system). Arranged for stitch welding. (Never used.) £380 or near offer.

One **AS25/24** Metropolitan Vickers Spot Welder S170995, 24in. arm reach. Serial 059015/7. £350 or near offer.

Apply in writing to BOX Z713, MACHINERY, Clifton House, Euston Road, N.W.1.

Westminster Type C Single

Ended Sealing Machine for sale. Motorised machine for cleaning the edge of sheet metal prior to resistance welding. Sheets of any length can be passed through the machine. Sealing speed approximately 40/45ft. per minute. Size of table 34in. wide x 54in. long.—Photo, etc., from F. J. EDWARDS LIMITED, 359-361, Euston Road, London, N.W.1, or 41, Water Street, Birmingham, 3.

Heald 42 Borematic, 400/3/50.—HICKS MACHINERY, LTD., 26, Addison Place, London, W.11. Tel.: PARK 2393.

Heald 81 Gagematic Internal Grinder, in excellent condition. Will accept reasonable offer. BOX Z710, MACHINERY, Clifton House, Euston Road, N.W.1.

WIDDOWSON

NEW BROADBENT 5ft. Vertical Boring and Turning Mill, swing 70in. diameter. Ex-stock.
JUNGENTHAL KE1200 4ft. Swing Single Column Turret Type Vertical Boring and Turning Mill, with side head, 20 h.p. motor, speeds 5-6 to 180 r.p.m.

SWIFT 4ft. Radial Drilling Machine, No. 4 Morse Taper Spindle, speeds 42 to 1,500 r.p.m.
JONES & SHIPMAN 20in. High Speed Pillar Drilling Machine, No. 3 Morse Taper Spindle.

FELLOWS No. 61 Spur Gear Shaping Machine, capacity 35in. dia. external, 24in. dia. internal.
ADAMS U.S.A. No. 5 Horizontal Gear Hobbing and Thread Milling capacity, 10in. dia., 49in. long.

JONES & SHIPMAN 138. 10in. x 27in. Universal Grinding Machine, good equipment.
CHURCHILL OSB 60in. x 8in. Hydraulic Horizontal Spindle Surface Grinding Machine, magnetic chuck.

CHURCHILL OSB 40in. x 8in. Hydraulic Horizontal Spindle Surface Grinding Machine.
CHURCHILL NB 18in. x 6in. Hydraulic Horizontal Spindle Surface Grinding Machine.

SWIFT 154in. Centres Heavy Duty All Geared Gap Bed S.S. & S.C. Lathe, admit 10ft. between centres.

SWIFT 13in. Centres High Speed All Geared Gap Bed S.S. & S.C. Lathe, admit 6ft. between centres, speeds 8-800 r.p.m.

HOLBROOK Model "C" 16 8in. Centres High Speed Tool Room Lathe, admit 36in. between centres, speeds 26 to 1,200 r.p.m.

WARD No. 7 Combination Turret Lathe, swing 16in. dia. over bed covers, excellent equipment including bar feed gear.

MINGANTI Type 20-40P Hydraulic Pre-Selector Bar Feed and Chucking Capstan Lathe, fully equipped.

WARD, HAGGAS & SMITH 36in. Swing Heavy Duty Boring and Surfacing Lathe. Modern Machine.

CINCINNATI No. 3 OM Dial Type Horizontal Milling Machine, table 624in. x 154in., backlash eliminator. As New.

ARCHDALE 28in. Plain Manufacturing Milling Machine, table 49in. x 13in.

MILWAUKEE 4K Heavy Duty Vertical Milling Machine, table 82in. x 18in., speeds 13-1,300 r.p.m.

MILWAUKEE 4H Heavy Duty Vertical Milling Machine, table 74in. x 154in.

CINCINNATI No. 2 Dial Type High Speed Vertical Milling Machine, table 524in. x 124in., power down feed head, speeds 20 to 1,500 r.p.m.

OSTER Model 326 6in. capacity Six-chaser Pipe Screwing and Cutting-off Machine. Unused.

CLIFTON & BAIRD No. 2 Hydraulic Heavy Duty Cold Circular Sawing Machine, capacity 84in.

HERBERT

WIDDOWSON

& SONS LTD.

CANAL STREET, NOTTINGHAM

'PHONE 42061.

When answering advertisements kindly mention MACHINERY.

Classified Advertisements (PLANT FOR SALE, contd.)

- BETTER TRY 600 FIRST !

for NEW AND USED PRESSES & SHEET METAL MACHINERY

New **BENNIE** 10ft. x 4in. Combined Plate Bending and Straightening Rolls, top roller 12in. dia., bottom rollers 10in. dia., outer or straightening roller 11in. dia.

New **BENTLEY** 250 ton capacity type G/15 Billet Shearing Machine, max. capacity 3 1/2 in. sq. M.S., air-operated clutch, automatic lubrication.

New **PEARSON** 8ft. x 4in. Electro Hydraulic Guillotine Shearing Machine of steel plate welded construction, 12in. gap in end frames.

New **STECO** 6ft. x 4in. Pyramid type Plate Bending Rolls, dia. of top roll 8 1/2 in., bottom rolls 7 1/2 in.

Used **BENNIE** All Steel Frame Section Cropping Machine, capacity 6in. x 6in. x 4in. angles at 90 deg. or 4in. x 4in. x 4in. at 45 deg., 1 1/2 in. round bars, 1 1/2 in. square bars.

New **HOLLMAN** Oil Hydraulic Bending and Straightening Press, capacity 315 tons, bed area 63in. x 25 1/2 in. Ram stroke 19 1/2 in.

Used **CRAIG & DONALD** 7 1/2 x 26 Straight Side Single Crank Geared Press, with 8in. stroke. Distance between columns 26in. Bed area 26in. x 38in.

Used **TAYLOR & CHALLEN** 40 tons capacity Open Front Rigid Power Press with 3in. stroke. Complete with Roll Feed Equipment and 2 speed motor drive.

Used **TAYLOR & CHALLEN** type 370 20 tons capacity Open Front Rigid Power Press with 2in. fixed stroke. Complete with Roll Feed Equipment, arranged for flat belt drive.

New **WEYBRIDGE** MS. 48 Medium type Rotary Gang Slitting Shears, max. capacity 6 cuts in 48in. x 4in. M.S.

New **BARNES** 6ft. x 4in. Upstroking Hydraulic Bending Press. Max. stroke 8in. 6in. gap in frames. 73in. between columns. 78in. overall bed.

New **RASKIN** R7 120 tons capacity Open Front Rigid Geared Power Press with adjustable stroke 4in. to 4 1/2 in. Bed area 35 1/2 in. x 24 1/2 in. Depth of throat 12 1/2 in.

ALL ARRANGED FOR MOTOR DRIVE 400-440/3/50.

**GEORGE COHEN
SONS & COMPANY LIMITED**
Sunbeam Road, London, N.W.10

Tel: Elgar 7222/7

Stanningley, Nr. Leeds.

Tel: Pudsey 224/1

Centreless Grinding Machine,
No. 7 B.S.A. Max. capacity 3in. dia.
Electrics 400/3/50. Excellent condition.—BOX
Z746. MACHINERY, Clifton House, Euston
Road, N.W.1.

"B.I.C." No. 131 Longitudinal
Seam Welding Machine for sale.
Specially suited for work which may be fed into
the machine throat, side or straight seams on
cylinders or drums. All electrical equipment
suitable for 400 volts, 50 cycles. Maximum
power required 12 kW. Two thicknesses of
20 s.w.g. Number of heating speeds 8. Depth
of throat 24in.—Photo and details from F. J.
EDWARDS, LIMITED, 359, Euston Road,
London, N.W.1, or 41, Water Street, Birmingham, 3.

TAYLOR & CHALLEN 8.3 Inclinable
Power Press, 40 tons pressure, 2in. stroke,
with roll feed and tie rods.
TAYLOR & CHALLEN No. 1220 Inclinable
Power Press, 20 tons pressure,
3in. stroke. With automatic guards.
TAYLOR & CHALLEN No. 1220 Inclinable
Power Press, 20 tons pressure,
blanking stroke 4in.
TAYLOR & CHALLEN 8.1 1/2 Non-
inclinable Power Press, 10 tons pressure,
blanking stroke 4in.

Robinson

4/6, Minerva Road, Park Royal,
LONDON, N.W.10.

Telephone: ELGar 4841-4842.

Carl Unger 10in. by 30in. Universal
Grinding Machine. Hydraulic. M/D.
400/3/50. With internal spindle.

CRAIG & DONALD 14ft. by 4in. Power Guillotine. Geared overcrank. M/D. 400/3/50.

TOWN 5ft. Radial Drilling Machine. No. 5
M.T. Low base. M/D. 400/3/50.

JONES & SHIPMAN 3-Spindle Drilling
Machine. No. 3 M.T. spindle. Flange mounted
motor. 400/3/50.

ALBERT EDWARDS (MACHINERY), LTD.,
79/89, Pentonville Road, London, N.1. Telephone:
TElRminus 0167/8/9

Several Plain Cylindrical Grinders
for sale from 6in. by 18in. to 14in. by
18in. Churchill, Landis and Precimax.—Write
stating size of interest, to BOX Z736,
MACHINERY, Clifton House, Euston Road,
N.W.1.

C.V.A. No. 8 Single Spindle
Automatic Lathes, 2 machines. Reconditioned
in 1954. With third slide. 2500 each to clear.
—BOX Z609, MACHINERY, Clifton House,
Euston Road, N.W.1.

Blacker Power Forging Hammer
for sale. With fixed type arm and
anvil. Motor driven for 400 volts, 3 phase,
50 cycles. Length of arm 20in. Stroke adjustable.
—F. J. EDWARDS LIMITED, 359, Euston Road,
London, N.W.1, or 41, Water Street, Birmingham, 3.

Archdale 28in. Horizontal Miller
with Vertical Attachment. 400/3/50.—
HICKS MACHINERY, LTD., 26, Addison Place,
London, W.11. Tel: PARK 2333.

Cashmores

**Selection of Machine Tools
from Stock or Early Delivery.**

DRILLING MACHINES

ASQUITH 4ft. 0in. Model O.D.1 Radial Drilling
Machine, two-motor type, elevating arm,
motorised 400/3/50 cycles.

KITCHEN & WADE 4ft. 0in. Sensitive Radial
Drilling Machine, two-motor type, box bed,
motorised 400/3/50 cycles.

BROACHING MACHINES

LAPORTE Model HP40 Horizontal Hydraulic
Broaching Machine, 40,000 lb. pulling
capacity, 64in. stroke, motorised 400/3/50
cycles.

LATHES

FAIRBAIRN 16in. Centre Heavy Duty Lathe,
15ft. 0in. between centres, swing 23in. dia.
over saddle, motorised 400/3/50 cycles.

LANG 16in. Centre Heavy Duty Lathe, 17ft. 6in.
between centres, 2 saddles, swing 19in. dia.
over saddles, motorised 400/3/50 cycles.

WARD No. 7 Covered Bed Capstan Lathe,
arranged chuck work, motorised 400/3/50
cycles.

New **MITCHELL** 12 1/2 in. Centre Gap Bed Lathe,
admit 8ft. 9in. between centres, motorised
400/3/50 cycles.

HONING MACHINE

KITCHEN & WADE Vertical Hydraulic
Honing Machine, capacity 2in. to 9in. dia.
bores up to 29in. long, motorised 400/3/50
cycles.

PLANING MACHINE

LOUDON 10ft. x 4ft. x 4ft. All Electric
Planing Machine, 4 tool boxes, Ward Leonard
drive.

SLOTING MACHINE

MUIR 30in. Stroke Heavy Duty Slotting
Machine, 50in. x 50in. tilting table, motorised
400/3/50 cycles.

BORING MACHINE

WALDRICH Heavy Duty Vertical Turret Lathe,
fitted side head, maximum swing 66in. dia.,
motorised 400/3/50 cycles.

GRINDING MACHINES

CHURCHILL Model VXA Vertical Spindle
Hydraulic Surface Grinder, table 72in. x
16 1/2 in., segmental wheel 18in. dia., motorised
400/3/50 cycles.

LUMSDEN Model 91LE Vertical Spindle
Rotary Table Surface Grinder, 36in. dia.
table, grinding wheel 18in. dia., motorised
400/3/50 cycles.

CHURCHILL Model OSB Horizontal Spindle
Hydraulic Surface Grinder, 30in. x 8in.
table, motorised 400/3/50 cycles.

CINCINNATI No. 2 Centreless Grinder, Filmatic
bearings, motorised 400/3/50 cycles.

NORTON 12in. x 36in. Hydraulic Universal
Grinder, motorised 400/3/50 cycles.

PRESSES

BLISS 400 Ton Knuckle Joint Press, stroke
2 1/2 in., bed area 20in. x 20in., motorised
400/3/50 cycles.

MILLING MACHINES

ARCHDALE 30in. Vertical Dial Type Milling
Machines, table 44in. x 14 1/2 in., motorised
400/3/50 cycles.

BOHLE Heavy Duty Dial Type Universal
Miller, table 55in. x 14in., motorised 400/3/50
cycles.

ARCHDALE 18in. Horizontal Dial Type Plain
Miller, table 30in. x 10in., motorised 400/3/50
cycles.

MISCELLANEOUS

RUSSELL 24in. Hydraulic Cold Metal Sawing
Machine cut up to 8 1/2 in. rounds, motorised
400/3/50 cycles.

NOBLE & LUND 22in. Hydraulic Cold Metal
Sawing Machine, cut up to 7 1/2 in. rounds,
motorised 400/3/50 cycles.

MASSEY 2 Cwt. and **ALLDAYS & O'NEILL**
1 Cwt. Pneumatic Power Hammers, motorised
400/3/50 cycles.

ADAMSON 30 Ton Overhead Electric Travelling
Crane, 42ft. 3in. span, motorised 400/3/50
cycles.

CLYDE 10 Ton Overhead Electric Travelling
Crane, 42ft. 3in. span, motorised 400/3/50
cycles.

ANDERSON GRICE 10 Ton Overhead Electric
Travelling Crane, 42ft. 3in. span, motorised
400/3/50 cycles.

CLYDE 5 Ton and **SMITH** 2 Ton Overhead
Electric Travelling Cranes, 34ft. 0in. span,
motorised 400/3/50 cycles.

JOHN CASHMORE LTD.,
GREAT BRIDGE, STAFFS. Tel: Tipton 2181/7
(Also at NEWPORT, MON.)

When answering advertisements kindly mention MACHINERY.

Classified Advertisements (PLANT FOR SALE, contd.)



PIDGEN BROS. LIMITED

HELMET ROW, OLD STREET, LONDON, E.C.1.

Telephone: CLerkenwell 6481

ALL MACHINES MOTORIZED FOR 3 PHASE SUPPLY UNLESS OTHERWISE STATED

**AUTOMATICS**CONOMATIC $\frac{3}{4}$ 4 Spindle.**CAPSTANS**

HERBERT No. 4. Barfeed.
WARD No. 8 Combination. Serial R.
WARD 2A and 3A. Serial M.
GISHOLT No. 4 Simplified. 2in. cap.
DRUMMOND Model K, 1in. Bar feed.
HILLE R.H.15 1in. Bar feed.
ACCURATOL 1in. Bar feed.
WARNER & SWASEY No. 2, 1in. Bar feed.
HERBERT No. 7 Combination Turret.
ACME 5W Universal Turret, 2in. Bar feed.
LIBBY 4A, 2in. Bar feed.
MURAD 1in. Bar feed.
HAHN & KOLB RH25. 1in. bar. Unused.
SOUTHWARK No. 2. 1in. Bar feed.

DRILLS

ARCHDALE 2lin. Production.
HERBERT Type B. Bench.
CORONA 13CX 2 Spindle No. 2 M.T.
ARCHDALE 5ft. Radial. 3in. cap.
JONES & SHIPMAN 2-sp. 15in., No. 2 M.T.
JONES & SHIPMAN 15in. Speed Drill-Max.
CORONA 12AX. 1in. cap.
BOLEY Cluster Type.
15in. HERBERT Type C, No. 3 M.T.

ENGRAVERS

T.M.A. Cutter Grinder.
ALEXANDER No. 1, 3 Dimensional.
T.M.A. Type G.3 and G.2.
LIENHARD Type 3R and 2.
T.T.H. Multi-Etcher.

FILING AND SAWING MACHINES

WICKSTEED 6in. Hacksaw.
EDGWICK Filer.
RAPIDOR No. 1 Hacksaw.
WICKSTEED Cold Saw No. 1, 6in.

FOLDERS

BESCO 3ft. x 18 g. No. 5 Angle Bender.
KEETONA 4ft. x 14 g. Cramp.

GEAR CUTTERS

SYKES HV14 Hobber.
MAXICUT 7in. x 2in. x 6 D.P.
RAPIDAN No. 1, 2lin. dia. gears.
FELLOWS "Hourglass."

GRINDERS (Cylindrical)TRUVOX 2 $\frac{1}{2}$ x 18.

FRANCIS 6 x 7.

PRECIMAX MPB 10 x 48.

MYFORD MG12. New.

PRECIMAX MPH Plain. 10 x 24.

PRECIMAX U.P.J.-Universal. 12 x 48.

NORTON 6 x 18 Hyd. Type C.

NORTON 10 x 36. Type C.

GRINDERS (Tool)

UNION 14in. and 10in. As new.

GRINDERS (Miscellaneous)

ALBA Tool and Cutter.
LE BLOND No. 2. T. & C.
JONES & SHIPMAN 310. T. & C.
J. & S. 12in. x 24in. 305 T. & C.
JONES & SHIPMAN Carbide.
HERBERT HUNT No. 4 Drill.

GRINDERS (Surface)

SNOW Table, 20in.
CHURCHILL OSB 40in. x 18in.
WRIGHT 8in. Table.
ROBOT 18 x 6.
SNOW P24, 24in. x 8in. Hyd.
ABWOOD 18 x 6 Vertical.

GRINDERS (Internal)

SMART & BROWN.
SAACKE Model VII, jig.

GUILLOTINE

KEETONA 4ft. x 14 g. Power.

HONERS

KITCHEN & WADE Hydraulic.
SUNNEN Type LB.
BARNES No. 2 Horiz.

KEYSEATER

CARTER & WRIGHT No. 2, 24in. x 1in.

LATHES

RIVETT 608 S.S. & S.C.
SMART & BROWN Type L. Sec. Op.
COULTHURST Surfacing and Boring.
EDWARDS 12in. Spinning.
WILLSON 7in. x 3ft. S.S. & S.C.
BRADFORD 8in. S.S. & S.C.
RYDERMATIC No. 12 Multi Tool.
CARDIFF 7in. x 60in.
DENHAM 5in. S.S. & S.C.
LE BLOND 11in. x 16in. Prod.
SOAG-OXFORD 6in. x 24in. S.S. & S.C.
SOUTHBEND 9in. (Workshop), 14in.
LE BLOND Regal 10in. swing.

MILLERS (Horizontal)

CENTEC 2A US Multi Mills.
U.S. (Whitney Type) Production.
KEMPSMITH No. 1G.
BROWN & SHARPE No. 12 and 000 Prod.
CINCINNATI 08 and 1-18 Prod.
BROWN & SHARPE No. 2 Univ. Light.
SUNDSTRAND No. 00 Rigidmill.
BURKE Table 16 x 34.
ARCHDALE 28in. Mfr.
CINCINNATI 3-24 Hyd. and 2 M.H.
HERBERT 15. Table 18in. x 8in.

MILLERS (Vertical)

RICHMOND VHM. Table 26 x 8.
VICTORIA V2. Table 40 x 10.
ARCHDALE 30in. Table 48 x 12.
HERBERT 155. Table 50 x 10.

POLISHING HEADS

CANNING 5 h.p.

PRESSES (Power)

BLISS No. 8.
BESCO TVO Bench, 4 ton.
O. & S. 30 tons Straightening.
BESCO EB4, 40 tons. New.
TAYLOR & CHALLEN B2. 10 tons.
RHODES No. 19. 10 tons.
SCHULER VYZ, 15 tons d/s gripper feed.

RIVETERS

HIGH-SPEED Hammer 4A. 1in.
ROTORIVET No. 5 Hammer.
TURNER 1in. RS2A Spinning.

SCREWING MACHINES

OSTER 1in.-6in. Pipes No. 326.
ATLAS No. 2, 3in.-6in. (Unused.)

SHAPERS

24in. ROCKFORD Hyd.

TAPPERS

HERBERT No. 2 Flash.
SUPERIOR 1in.
JONES No. 26. 2 B.A.-1in.
THIEL Nos. 3 and 4.
J. & S. Electrotap, 1in.

THREAD MILLERS

FACKS Plain, cap. 3in. x 1in.
REINECKER 8 x 72in.
LEES BRADNER Mod. 40. 6in. H.M.
HANSON WHITNEY, 8in. x 40in.

Pollard 12AX 4-Spindle $\frac{3}{4}$ -in.
capacity Drill, in good condition. Table
23in. by 10in. Fully motorised.—BOX Z762,
MACHINERY, Clifton House, Euston Road,
N.W.1.

C.E.M

ACME-GRIDLEY 4-spindle Bar Auto-
matic, 3in.

WICKMAN 5-spindle Chucking Auto-
matic, 5in.

MUIR 24in. Travelling Spindle Horizontal
Borer.

BIERNATZKI Gear Hobber, 27in. dia.
max.

PROGRESS 4E Pillar Drill, new.

SEDGWICK 6ft. x 1in. Univ. Folder.

WARD 2A Capstan, bar feed.

Fully detailed stock lists available.

CHARLES E. MATTHEWS
(MACHINE TOOLS) LTD.

34, Gladstone Road,
Croydon, Surrey.

Tel.: THORnton Heath 1783.

Tilghman Sandblasting Plant

for sale. Comprising cabinet, mixing
chamber, motor-driven compressor unit, dust
arresting plant and exhaust fan. Cabinet 71in.
x 47in. x 47in. high with two hand openings
and sight glass. Compressor unit comprising
type FC4E. Vertical Compressor, maximum
working pressure 30 lb. p.s.i. Arranged motor
drive, 400-440 volts, 3 phase, 50 cycles.—Photo
and full details from F. J. EDWARDS, LIMITED,
359, Euston Road, London, N.W.1, or 41, Water
Street, Birmingham, 3.

No. 3U "Adcock & Shipley"

motorised all-gear Universal Milling
Machine. Table 50in. by 12in., has long
travel of 30in. Spindle speeds 30-1,400 r.p.m.
Auto feed 1in.-50in. per min. all movements.
Rapid traverse by separate motor. Good
equipment. Post war machine.—LEE &
HUNT, LTD., Crocus Street, Nottingham.
Tel.: 84246.

Workpans, Large Quantities

Strong Gauge Workpans, size 16in. by
14in. by 5in., forged riveted handles, approx.
weight 1 lb., price 8s. 6d. each, quantities. Other
size manufactured.—Contact J. BURTONS
WORKS, Axtley, Shrewsbury. Tel. Shawbury 266

**STAINES MACHINE
TOOL COMPANY**

1953 **WARD** No. 8 comb. turret lathe
equipped. As new.

WARD No. 7 chucking capstan 1942.
Machine in first-class condition.

1957 **WARD** 3A capstan lathe. Little
used.

1955 7in. **WILLSON** S.S. & S.C. lathe
with equipment.

7in. **D.S.G.** a.g.h. gap bed S.S. & S.C.
lathe, equipped.

As New. **KERRY** 125 1in. capacity
pillar drilling machine, power feeds.

POLLARD six-spindle drilling machine
No. 2 Morse taper.

OUR WEEKLY BARGAIN

7in. **LE BLOND** S.S. & S.C. lathe,
a.g.h. 400-440/3/50. Good con-
dition. £85.

Riverside Estate, Causeway, Staines.
Telephone: Staines 2647.

Conomatic 3in. 4-Spindle Bar
Automatics, 1943 manufacture, in excellent
condition.—BOX Z755, MACHINERY, Clifton
House, Euston Road, N.W.1.

When answering advertisements kindly mention MACHINERY.

Classified Advertisements (PLANT FOR SALE, contd.)

RING BELLS for machine tools

LEEDS 63-7398

TAYLOR & CHALLEN Bl¹ Inclinable Press. Stroke 1 $\frac{1}{2}$ in. Tonnage rating 6. M.D. 400/3/50.

JONES & SHIPMAN Fig. 137 Universal Precision Grinder. Centre height 5in. Admits 24in. between workhead and tailstock. Elevating and swivelling wheelhead, steadies, diamond dresser, internal spindle, etc. M.D. 400/3/50.

NORTON Type C, 10in. by 48in. Hydraulic Plain Grinder. Grinding wheel 20in. dia. Hydraulic feeds. Filmatic bearings. M.D. 400/3/50.

ACME GRIDLEY six-spindle Bar Auto, capacity $\frac{1}{2}$ in. With bar feed and other equipment. Screwing spindle. M.D. 400/3/50.

FARMER NORTON 4in. Centreless Bar Turning Machine. Suitable for 1in. to 4in. bars, with various cutter heads and other equipment. M.D. 400/3/50.

HERBERT Junior Chucking Auto with air chuck, knee tools, etc. 6in. swing. Reconditioned. M.D. 400/3/50.

BULLARD 36in. Vertical Borer. Swings 38in. 12 speeds 12 to 200 r.p.m. With side head. M.D. 440/3/50.

ASQUITH 3ft. 9in. Portable Universal Radial Drill. Built 1942. Spindle No. 4 M.T. Speeds 40 to 300 r.p.m. M.D. 400/3/50.

MINIMUS Gear Hobber. Will take blanks up to 2 $\frac{1}{2}$ in. dia. by 2 $\frac{1}{2}$ in. length. Design similar to Mikron 79. M.D. 400/3/50.

BALLINGER Model C.10 Abrasive Cutting-off Machine. Built 1951. Takes 16in. dia. wheels. Cuts 2in. solid M.S. bars. 3in. tubes. M.D. 400/3/50.

HERBERT 50in. Horizontal Broaching Machine. 20-ton pull. Max. stroke 50in. Screw operated. M.D. 400/3/50.

CHURCHILL No. 1 Planetary Type Internal Grinder. Capacity with largest internal spindle 10in. dia. by 18in. length. Hydraulic operation with four internal grinding spindle, dust extraction unit, etc. Reconditioned.

WILSON 7 $\frac{1}{2}$ in. S.S. & S.C. Gap Bed Lathe. A.G.H. Admits 4ft. 6in. between centres and 26in. in gap. M.D. 400/3/50.

WARD No. 7 Capstan with covered bed. Speeds to 750 r.p.m. Air operated chuck. M.D. 400/3/50.

WARD 2A Capstan. Six speeds to 1,531 r.p.m. Collet cap 1 $\frac{1}{2}$ in. M.D. 400/3/50. Reconditioned.

CINCINNATI No. 4 Dial Type Universal Miller. Table 78 $\frac{1}{2}$ in. by 16 $\frac{1}{2}$ in. long traverse 42in. Quick power all ways. Dual controls. 21 speeds 18 to 1,300 r.p.m. With swivelling vertical head. Reconditioned. M.D. 400/3/50.

CINCINNATI 08 Vertical Miller. Table 24 $\frac{1}{2}$ in. by 9in. Long power traverse 8 $\frac{1}{2}$ in. Eight speeds 150 to 1,300 r.p.m. M.D. 210-420/3/50.

RICHMOND H.2.5 Plain Horizontal Miller-Table 35in. by 9in. Speeds 30 to 360 r.p.m. M.D. 400/3/50.

GOULD & EBERHARDT 28in. Heavy Duty Crank Shaper. With 16in. swivel vice. M.D. 400/3/50.

BUTLER 12in. Precision Slotter. Circular T-slotted table 24in. dia. With power feeds to long, cross and rotary motion. M.D. 400/3/50.

BIGWOOD Model R.S.1 10-roll Section Straightening Machines. Built 1947. Cap. 1in. rounds or squares 1 $\frac{1}{2}$ in. by $\frac{1}{2}$ in. angles in M.S. M.D. 400/3/50.

WICKSTEED 24in. Cold Saw. Cap. 6 $\frac{1}{2}$ in. rounds. Hydraulic infeed to blade. M.D. 400/3/50.

WARD 10/13 Combination Turret Lathe with various items of equipment. M.D. 400/3/50.

BERRY 8 $\frac{1}{2}$ in. S.S. & S.C. Lathe. A.G.H. Admits 5ft. between centres. M.D. 400/3/50.

H. BELL (Machine Tools) LTD., Walter Street, LEEDS 4.



OFFER

**AT ATTRACTIVE PRICES
LONG BED AND HEAVY
DUTY LATHES**

30 $\frac{1}{2}$ in. **HARVEY** Long Bed S.S. & S.C. Lathe, motor drive, two saddles with rapid power traverse, swing over bed 61in., admits between centres 61ft.

19in. **CRAVEN** S.S. & S.C. Lathe, motor drive, vee bed, swing over bed 38in., swing over saddle 26in., admits between centres 28ft.

18in. **LE BLOND** Heavy Duty Geared Head Engine Lathe, size 32in., admits between centres 28ft.

18in. **LANG** S.S. & S.C. Lathe, motor drive one or two saddles, swing over bed 36in., swing over saddle 25in., admits between centres 12ft. 6in. Two available.

10in. **FAIRBAIN LAWSON** Heavy Duty S.S. & S.C. Lathe, motor drive, swing over saddle 23in., admits between centres 15ft.

14 $\frac{1}{2}$ in. **CRAVEN** S.S. & S.C. Lathe, motor drive, 2 saddles, swing over bed 29in., swing over carriages 20in., admits between centres 28ft.

13 $\frac{1}{2}$ in. **MONARCH** Geared Head S.S. & S.C. Lathe, type CM, 24in. motor drive, swing over carriage 14in., between centres 24ft.

13 $\frac{1}{2}$ in. **LODGE & SHIPLEY** S.S. & S.C. Lathe vee bed, Norton gearbox, motor drive, swing over bed 27 $\frac{1}{2}$ in., swing over saddle 19in., admits between centres 14ft.

INSPECTION INVITED
BUY NOW AND SAVE MONEY.

Full details from:—

SOAG MACHINE TOOLS LTD.
JUXON STREET, LAMBETH, LONDON, S.E.11

'Phone: RELiance 7201.
'Grams: "Sotoolsag," London, S.E.8.

Lamination High Speed Wien-
garten Press, 70 tons capacity, with shaft-driven gripper feed mechanism. Variable stroke and 8 variable speeds. In excellent condition.—BOX 2770, MACHINERY, Clifton House, Euston Road, N.W.1.

Moon Brothers Model AM.

Power Wire Squaring or Forming Machine for sale. Suitable for bending the reinforcing wire used around the tops of square or rectangular tins or containers. Adjustable gauge for locating bending point. Arranged motor drive for 440 volts, 3 phase, 50 cycles.—Details, etc., from F. J. EDWARDS, LIMITED, 359, Euston Road, London, N.W.1, or 41, Water Street, Birmingham, 3.

Grinders: The Following Ma-

chines were purchased new in 1956 and are now available having only had approximately six months use. Scrivener No. 24 motorised centreless Grinder. Newall/Keighley 15in. motorised Internal Grinder and Newall/Keighley 8in. motorised Internal Grinder.—Apply Mr. D. WILSON, SOUTHERN INSTRUMENTS, LTD., Frimley Road, Camberley, Telephone 3401.

MIDLAND

HERBERT O Capstan. Bar feed and tooling.

WARD O.E. Capstan. Bar feed and tooling.

WARD 7 Capstan. Bar feed and tooling.

HOLBROOK 9in. Lathe. Taper turning etc.

PROGRES 20in. by 9ft. b.c. Gap Bed Lathe.

BROWN & SHARPE No. 2 Universal Grinder.

BIERNATZKI F.W. 2A Miller. Table 55in. by 14in.

HERBERT 21 Combination Turret Lathe.

WEINGARTEN 4ft. 6in. by $\frac{1}{2}$ in. Swing Beam Folder.

CRAIG & DONALD 10ft. by $\frac{1}{2}$ in. Swing Beam Folder.

BUTLER 12in. by 5ft. by 5ft. Planer. Three toolboxes.

KOLB 4ft. Radial Drill.

ASQUITH 4ft. 6in. Radial Drill.

G.S.P. 6ft. Radial Drill.

CINCINNATI 1/18 Production Miller.

KEARNS No. 3 Horizontal Borer.

THE MIDLAND MACHINE TOOL CO

BRADLEY, BILSTON, STAFFS. Bilston 42471/7

Classified Advertisements (PLANT FOR SALE, contd.)



NEW MACHINE TOOLS FROM STOCK

GRANOR OF HALIFAX 11in. Gap Bed Lathe, by 8ft. 0in. b.c. Hole in spindle 3/4in. dia. 400-440/3/50

MITCHELL OF KEIGHLEY 8 1/2in. Gap Bed Lathe by 5ft. 3in. b.c. 400-440/3/50

MITCHELL OF KEIGHLEY 10 1/2in. Gap Bed Lathe by 5ft. 3in. b.c. 400-440/3/50

MITCHELL OF KEIGHLEY 12 1/2in. Gap Bed Lathe by 6ft. 9in. b.c. 400-440/3/50

EXCEL No. 3/12 Hydraulic Horizontal Spindle Surface Grinding Machine. Capacity 24in. by 8in. Coolant equipment Motorised 400-440/3/50

VICTORIA V2 Vertical Milling Machine. Spindle speeds 32-1,050 r.p.m. Table 45in. by 11in. Table traverse 29 1/2in. 400-440/3/50

VICTORIA U2 Universal Milling Machine. Spindle speeds 30-1,010 r.p.m. Table 45in. by 11in. Longitudinal traverse 30in. 400-440/3/50

USED MACHINE TOOLS

STIRK Double Housing "Worm-Worm" Single Spiral Drive, Planing Machine. Capacity 8ft. 0in. x 50in. x 48in. 4 Toolboxes. Modern machine. Split Field drive for 400/3/50. Almost new condition.

NORTON Horizontal Spindle Hydraulic Surface Grinding Machine, with hydraulic cross feed head. Capacity 45in. by 10in. Complete with D.C. magnetic chuck and generator. Coolant pump and fittings. 400-440/3/50

HERBERT No. 4 Capstan Lathe, with draw-back collet, and power feed to turret slide. 400-440/3/50

NEWALL Type L 10in. by 24in. Plain Grinding Machine. 400-440/3/50

LE BLOND A.G.H. S. & S. Lathe, 15in. dia. swing. 400-440/3/50

HULLER No. 5 Vertical Tapping Machine. 400-440/3/50

POLLARD 21A Single Spindle Vertical Production Drilline Machine.

ARCHDALE 18in. High Speed Vertical Milling Machine. Table size 38in. by 10in. Spindle speeds 79-2,000 r.p.m. 400-440/3/50

DEAN, SMITH & GRACE 12in. Gap Bed Lathe by 3ft. 6in. b.c. 400-440/3/50

BROWN & SHARPE No. 2 Light Plain Milling Machine, with dividing head, and universal vertical head. 400-440/3/50

ARCHDALE 20in. Horizontal Plain Milling Machine, longitudinal feed 20in. 400-440/3/50

WE UNDERTAKE REBUILDING OF ALL TYPES OF MACHINE TOOLS.

CENTAUR TOOL WORKS,
EYRE STREET, SPRING HILL,
BIRMINGHAM, 18.
Tel.: EDGaston Grams:
1118 & 1119 Capstan, Birmingham.



CRAIG & DONALD Model 400/10 All Steel Motorised Double Geared Press Brake, of steel plate construction. Arranged motor drive for 440/3/50. Pressure exerted approximately 400 tons. Former capacity 10ft. x 1/2in. Width between side frames 82in. Stroke approximately 4in. Weight approximately 29 tons.

NEW MODEL L0290C Press Brake, of all steel plate arc welded construction. Pressure exerted approximately 200 tons. Maximum working length 167in. Distance between uprights 140in. Maximum thickness of plate formed 47in. Horsepower of main motor 20 at 1,450 r.p.m.

RHODES Motorised Double Geared Press Brake, with cast-iron side frames, reinforced by nickel-chrome steel bars. Bed and top beam of steel plate. Direct geared motor drive for 400/3/50. Pressure exerted approximately 150 tons. Former capacity 10ft. x 1/2in. or 18ft. x approximately 1in. Clear width between housings 10ft. 2in. One top 90 deg. forming tool supplied, also one bottom die with two vee openings 1 1/2in. and 1 1/4in. wide. Weight approximately 20 tons.

NEW BRUECK Type 20/1600 All Steel Motorised Press Brake. Geared steel plate construction. Arranged motor drive for 400-440/3/50. Maximum pressure approximately 20 tons. Former capacity 63in. x 1in. Weight approximately 36 cwt.

STOCK SOILED All Steel Press Brake of welded steel plate construction. Completely motorised for 400/3/50. Capacity 8ft. x 1/2in. Length of bed and ram 96in. Distance between side frames 69in. Stroke 3in. Treadle operated friction clutch.

BESCO Size R150/10 All Steel Press Brake of steel plate construction. Arranged motor drive for 380-420/3/50. Pressure exerted approximately 150 tons. Former capacity 10ft. x 1/2in. Die opening 1 1/2in. Length of stroke 3in.

Photographs of the above are available.

**VERY FAVOURABLE HIRE PURCHASE
TERMS CAN BE OBTAINED**

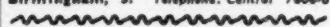
MACHINE TOOLS, NEW AND USED,
Of Every Description. Attractive Prices.

F. J. EDWARDS LTD.

359-361, EUSTON RD., LONDON, N.W.1

Telephone: EUSTON 4681-3771.

And at Lansdowne House, 41, Water St.
Birmingham, 3. Telephone: Central 7406-9



Taylor Challen B2 Press. Capacity 10 tons. Throat 6 1/2in. Daylight 8in. Adjustable stroke.—BOX Z786, MACHINERY, Clifton House, Euston Road, N.W.1.

Nearly New, 1,000 Ton Eumuco

Coining and Sizing Press, 2in. stroke, 31in. between sides. Air operated clutch and brake, with 40 h.p. motor drive. Heavy steel plate construction.

160 ton Hordern, Mason & Edwards High Speed Friction Screw Press, type 4SP, 13in. effective stroke. 21in. tool space. 6 1/2in. dia. screw. 10 h.p. motor drive.

REED BROTHERS (ENGINEERING), LTD.,
Replant Works,
Woolwich Industrial Estate,
London, S.E.18.

Telephone: Woolwich 7611/6.

Herbert 2D Capstan Lathe. Just reconditioned. 14in. dia. capacity.—BOX Z777, MACHINERY, Clifton House, Euston Road, N.W.1.

Taylor & Challen B3 1/2 Geared
Press, 60 tons, 3in. stroke. Fitted 9in. double roll feed. Mot.—WILCOX & CO., Barr Street, Birmingham, 19. Northern 1234/5.

New Britain-Gridley No. 60

1in. capacity six spindle Bar Automatic. Petermann P7. 3 1/2in. capacity Sliding Head Single Spindle Automatics.

Petermann No. 2 Pinion and Gear Cutting Machines.

Herbert No. 6 Chucking Automatic.

Covenry Gauge and Tool Gap Gauge Grinder. Newall 6in. x 18in. Hydraulic Plain Cylindrical Grinder.

B.S.A.-Lands 6in. x 18in. Type C Hydraulic Plain Cylindrical Grinder.

Brown & Sharpe No. 3 3/4in. x 18in. Hydraulic Plain Cylindrical Grinder.

Head No. 73 Hydraulic Centresless Internal Grinder.

Bryant 16-28 Hydraulic Internal Grinder.

All of the above are modern machines, in first class condition, motorised for 400-440/3/50 A.C. electric supply and are offered at genuine bargain prices.

THE WEST MIDLAND EQUIPMENT CO.,
10, HADEY ROAD, STOURBRIDGE, WORCS. STOURBRIDGE 4187.

Rhodes No. 146 Combined Drum

Flanging and Double Seaming Machine for round drums for sale. The drums revolve. Capacity up to 14in. diameter x 24in. high. Maximum thickness, 22 s.w.g. Treadle friction clutch. Weight about 30 cwt.—Photo, etc., from F. J. EDWARDS LIMITED, 359, Euston Road, London, N.W.1, or 41, Water Street, Birmingham, 3.

Lorenz Gear Shaper, Model

S.O.O. Capacity 7 1/2in. P.D. x 2in. face. Motorised.—WILCOX & CO., Barr Street, Birmingham, 19. Northern 1234/5.

Two Edgwick Fully Automatic

Face Cutter Grinders, for cutters 4in. to 20in. diameter. Also some types of side cutters.—BOX Z703, MACHINERY, Clifton House, Euston Road, N.W.1.

Avery Electrodynamical Balancing

Machine, type 728, capacity 30oz.-20lbs. Almost new. £420.—BOX Z704, MACHINERY, Clifton House, Euston Road, N.W.1.

500 Ton Double Action Drawing

Press, blankholder 60in. x 60in. with self-contained Oil Pump Unit.

REED BROTHERS (ENGINEERING), LTD.,
Plant Works,

Woolwich Industrial Estate,
London, S.E.18.

Telephone: Woolwich 7611/6.

Pollard Corona 4-Spindle Drill,

8 spindle speeds to 1,465 r.p.m., with pole change motors and geared heads. No. 3 M.T.—BOX Z791, MACHINERY, Clifton House, Euston Road, N.W.1.

Snow Hydraulic Surface Grinder,

Table 32in. x 8in. Auto. feeds. Horizontal Spindle. Mot.—WILCOX & CO., Barr Street, Birmingham, 19. Northern 1234/5.

When answering advertisements kindly mention MACHINERY.

MACHINERY'S HANDBOOK

THE FINEST REFERENCE BOOK IN THE WORLD
FOR ALL THOSE ENGAGED IN THE METAL WORKING
INDUSTRIES. OVER ONE MILLION COPIES SOLD

MACHINERY'S HANDBOOK is recognised by engineers all over the world as the standard reference book of the machine-building industry. More than one million copies are in daily use by every grade of engineer, machinist and draughtsman. These million satisfied users—all practical men—enthusiastically tell us that the handbook contains just that essential and reliable information they need most in their daily work.

The latest edition of MACHINERY'S HANDBOOK contains nearly 2,000 pages and is packed with the most up-to-date and complete collection of data, standards, formulae and practical information, representing the latest designing and manufacturing practice. It is amply illustrated with clear and easy-to-read diagrams, drawn by skilled draughtsmen; descriptions by practical engineers explain to the user not only "how" but "why".

MACHINERY'S HANDBOOK

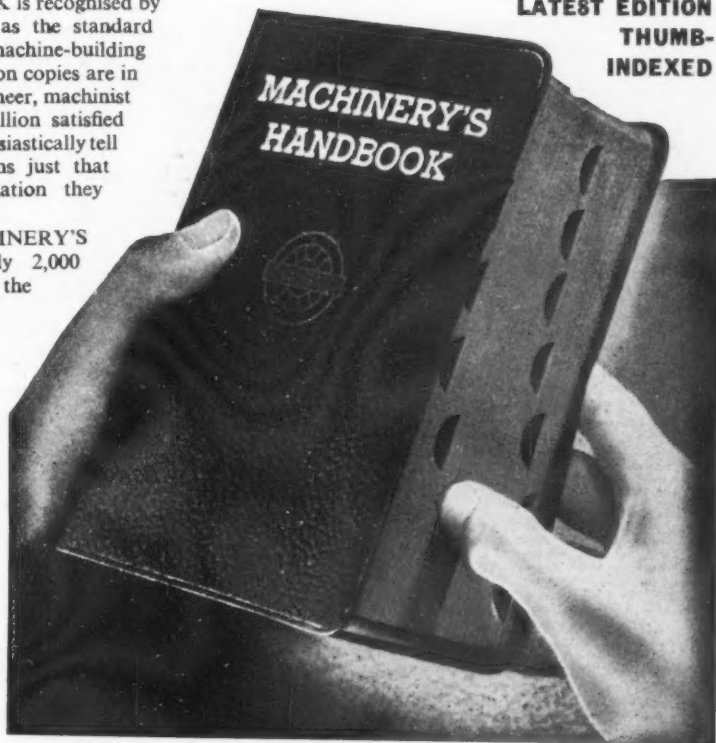
Is Sent Free on Approval
NO DEPOSIT

You can handle and examine a copy quietly in your own home. Just sign and post this coupon and the latest edition will be sent post free by return. No deposit of any kind is required. Could any offer be fairer? Sign the coupon... NOW!

Free Examination Scheme applies to U.K. and Eire only.

WRITE FOR COMPLETE BOOK CATALOGUE.

LATEST EDITION
THUMB-
INDEXED



To MACHINERY, National House, 21 West Street, Brighton, 1, Sussex.
Please Send me MACHINERY'S HANDBOOK.

1. For which I enclose CASH for £3.12.0.
2. By C.O.D. for which I will pay postman £3.12.0 on delivery
3. For FREE INSPECTION in which case I will return it to you in 5 days or pay
 - (a) CASH £3.12.0 in full within 10 days from invoice date, or
 - (b) 80/- by INSTALMENTS of 13/4 in 10 days and 13/4 monthly.

NAME POSITION
ADDRESS FIRM

NOTE: Overseas orders must be accompanied with cash price, plus 3/0 postage.

When answering advertisements kindly mention MACHINERY.

Classified Advertisements (PLANT FOR SALE, contd.)

ACBARS LIMITED

57a, HOLBORN VIADUCT,
LONDON, E.C.1.

Telephone: Central 2287. Telegrams: Acfib. Cent. London

AVAILABLE FROM STOCK

All machines listed below are at our Works in Sutherland Walk, Walworth Road, S.E.17.

AUTOMATICS

HERBERT Auto. Junior.
HERBERT 3A Chucking Auto.
ACME-GRIDLEY, Type R, 4-spindle, $\frac{1}{2}$ in. capacity.
ACME-GRIDLEY, Type R, 4-spindle, $\frac{1}{2}$ in. capacity. (2 machines.)
WICKMAN 4mm. Swiss Type.
BECHLER 7mm. Swiss.
RYDERMATIC No. 12 Multi Tool Lathes

GRINDERS

CHURCHILL No. 2 Hydraulic Splineshaft Grinder.
ABWOOD Vertical Spindle Surface.
BROWN & SHARPE No. 2 Surface Grinder.
JONES & SHIPMAN Fig. 62M Plain Cyl., 8 in. dia. by 10 in.
LANDIS 10 in. by 18 in. Plain Grinder.
CHURCHILL 24 in. by 10 in. Universal.
JONES & SHIPMAN Fig. 138 10 in. by 27 in. Universal Grinder.
BRYANT 16C 16 in. Internal Grinder.
SMART & BROWN Internal Grinder.
ROWLAND three wheel Carbide Tool Grinder and Capper.

CAPSTAN LATHES

HERBERT No. 0 $\frac{1}{2}$ in. collet cap. (2).
MURAD $\frac{1}{2}$ in. Capstan Lathe.
SOUTHWARK No. 2 $\frac{1}{2}$ in. Capstan Lathe.
DRUMMOND Type K Capstan Lathes (2).
GISHOLT No. 4 Friction Head Capstan.
LIBBY 4R 2 in. Capstan Lathe. Bar feed.
BARDONS & OLIVER No. 5 Capstan Lathe.
HERBERT No. 7 Turret Lathe.
FOSTER No. 2B Turret Lathe.

CENTRE LATHES

SOAG OXFORD 65 in. Centre Lathe.
SOUTHBEND 13 in. swing taper turning.
WILLSON 8 in. A.G.H. Lathe.
CARDIFF 8 in. by 48 in. Lathe.

MILLERS

HERBERT No. 1 Horizontal.
VICTORIA MO Plain.
New VICTORIA U1 and U2 Universal.
ARCHDALE 20 in. Horizontal Mills (3).
ARCHDALE 28 in. Horizontal Mill.
RICHMOND VHM Vertical Mill.
New VICTORIA V2 Vertical.
HOLROYD T117 Thread Mill (4).
HELLER Automatic Thread Millers (4).

MISCELLANEOUS

TAYLOR No. 1 Cutting-off Machine for Tubes and Bars.
JONES & SHIPMAN 2-spindle Pillar Drill, with No. 3 M.T. spindle, power feed.
New ESSEX 18 Bandsaw.
New RICHMOND SR2 3ft. Radial Drill.
All Machines motorised 400/3/50 unless otherwise stated.

Acme Gridley $\frac{1}{2}$ in. Bar Capacity

4-spindle Automatic Lathe. Excellent condition. Cheap.—BOX Z714, MACHINERY, Clifton House, Euston Road, N.W.1.

Churchill Redman Profiling

Lathe with hydraulic tracing equipment. Capacity 12 in. by 40 in. Full electric and fitted coolant supply. Very powerful machine in excellent order, having been reconditioned.—BOX Z687, MACHINERY, Clifton House, Euston Road, N.W.1.



HIGH CLASS

New and Rebuilt MILLING MACHINES At Competitive Prices

VERTICAL

V3 MASERATI, new, high-speed dial sliding and swivelling head, multi-motor drive, rapid power traverse in all directions by separate motor, table working surface 50 in. \times 13 in. capacity 35 in \times 11 in. \times 18 in., 20 spindle speeds 18-2,000 r.p.m.; spindle motor 10 h.p.
47V HERBERT, kneeless type, multi-motor drive, table 72 in. \times 17 in., capacity 48 in. by 16 in., maximum distance table top to spindle nose 23 in., 16 spindle speeds 21-750 r.p.m.
CV25 KENDALL & GENT (kneeless), circular table type, table diameter 30 in., capacity 30 in. \times 26 in. \times 32 in.
28-60 CINCINNATI Vertical Hydro-Tel, fixed height bed, single power control lever, stepless feed regulation, rapid power traverse, table working surface 85 in. \times 26 in., capacity 60 in. \times 30 in., vertical 14 in., 16 spindle speeds from 52-1,300 r.p.m.

PLAIN HORIZONTAL

No. 2 CINCINNATI, medium speed, dial type, table working surface 48 in. \times 12 in., capacity 26 in. \times 10 in. \times 19 in.
No. 4 CINCINNATI, medium speed, dial type, table working surface 74 in. \times 16 in., capacity 42 in. \times 14 in. \times 20 in.
No. 2B BROWN & SHARPE Standard Plain, table working surface 51 in. \times 11 in., capacity 28 in. \times 10 in. \times 18 in.
VFP2 PEDERSEN, table working surface 51 in. \times 12 in., capacity 32 in. \times 9 in. \times 18 in. (New.)

UNIVERSAL

82 CRAVEN, table size 55 in. \times 13 in., capacity 36 in. \times 10 in. \times 16 in.
1N PARKINSON, table size 46 in. \times 10 in., capacity 25 in. \times 9 in. \times 18 in.

PRODUCTION

3/36 CINCINNATI Plain Hydromatic, table size 52 in. \times 15 in., travel 36 in.
4/48 CINCINNATI Plain Hydromatic, table size 77 in. \times 16 in., travel 48 in.

VARIOUS

ASQUITH Model H.K.5 Horizontal Duplex Head Keyway and Cotterway Milling Machine for keyways up to 3 in. \times 15 in., table working surface 60 in. \times 10 in.

Your inspection is cordially invited.

We specialise in rebuilding the heavier types of machine tools and would welcome your inquiries.

SOAG MACHINE TOOLS LTD., JUXON STREET, LAMBETH, LONDON, S.E.11

'Phone: RELiance 7201.
'Grams: Sotoolsag, London, S.E.11.

Several OG Brown & Sharpe

Automatics, capacity 1 in., 8,400 series. Some with third slides and slotting attachments.—BOX Z671, MACHINERY, Clifton House, Euston Road, N.W.1.

German Marine Diesels and

High Speed Hull.
Two Mercedes 2,500 h.p. each. Ready for installation. £1,200 per unit.
Also 110ft. NEW High Speed Hull, only £550.
Write CARR, 12, Inglemere Road, S.E.23.
'Phone: FOR. 4161.

B.S.A. $\frac{1}{2}$ in. S.S. Automatic With

vertical slide and Standard Electrics. Very good condition. £440.—BOX Z680, MACHINERY, Clifton House, Euston Road, N.W.1

Moon Bros. Type AH Handle

Forming Machine for sale. For straightening, cutting and shaping rod or wire to the "race track" form of handle common to 5, 10 and 12 gallon drums. Complete with coil holder. Maximum diameter of rod handled $\frac{1}{2}$ in.—Photo, etc., from F. J. EDWARDS LIMITED, 359, Euston Road, London, N.W.1, or 41, Water Street, Birmingham, 3.

Ward 3A Capstan Lathe Fitted

with 3-law airbrake and control gear, spindle speeds 59 to 1,155 r.p.m., electric coolant pump, power feeds to turret, carefully used self-contained machine in good condition £275.—E. SMITH (MACHINE TOOLS), LTD., 76, St. Lukes Road, Birmingham, 5. Tel.: CALthorpe 3761.

Herbert 7B Combination Turret

Lathe for sale. Dial change headstock. Flanard bed. Recent machine in very good condition. Can be seen working. Price £1,300.—BOX Z723, MACHINERY, Clifton House, Euston Road, N.W.1.

Smart & Brown Lathes, Three

available, one screwcutting, one plain screw feed, one plain lever feed. Mot. Capstan slide and cut-off slide.—C. L. THOMAS, LTD., 18, Park Avenue, Solihull 1281.

Two Gisholt Friction Head

Capstan Lathes with bar feed and quantity of tooling. Available at low price for quick sale.—BOX Z719, MACHINERY, Clifton House, Euston Road, N.W.1.

Pfauter Gear Hobbing Machines,

models RS4 and RS1. In excellent condition.—BOX Z693, MACHINERY, Clifton House, Euston Road, N.W.1.

30 in. Archdale Vertical Column

Drilling Machine with quick-acting compound table. Flange-mounted motor, 5 h.p. 400-440/3/50. Speeds 60-1,500 r.p.m. Spindle bored No. 5 M.T. Post-war machine.—LEE & HUNT, LTD., Crocus Street, Nottingham. Tel.: 84246.

Carl Unger Camshaft Grinder,

with master cam grinding attachment. Capacity 24 in. by 5 in. dia. Will grind multiple throws. Rebuilt machine.—BOX Z701, MACHINERY, Clifton House, Euston Road, N.W.1.

Herbert No. 4 Senior Capstan

Lathe. A.G.H. Speeds 40-1,000. Fitted chasing saddle. Mot.—WILCOX & CO., Barr Street, Birmingham, 19. NORTHERN 1234/5.

Archdale Vertical Mill, All-

geared, motorised, 9 speeds 45-660 power feeds, elevating head, good condition.—C. L. THOMAS, LTD., 18, Park Avenue, Solihull 1281.

Churchill HBA Internal Grinder,

cap. 4 in. dia. \times 2 in. Hydraulic operation Motorised.—WILCOX & CO., Barr Street, Birmingham 19. NORTHERN 1234/5.

When answering advertisements kindly mention MACHINERY.

RING BELLS for machine tools

LEEDS 63-7398

Cincinnati No. 2 Tool and Cutter
Grinder, with internal grinding machine.
Just rebuilt.—BOX Z706, MACHINERY, Clifton House, Euston Road, N.W.1.

Edgwick Vertical Surface
Broacher. Slide 60in. x 12in. Table
14in. x 14in. Motorised.—WILCOX & CO.
Barr Street, Birmingham, 19. Northern 1234/5.

ARTICULATED VEHICLES FOR SALE

Leyland Beaver Tractor and
20-ton Low-loader Machinery Trailer,
17ft. well. K.O. Back Axle.—BOX Z651,
MACHINERY, Clifton House, Euston Road,
N.W.1

AUCTION

By Order of the Joint Liquidators of Messrs
A. Clay & Son, Ltd. (in Creditors' vol. liq.) also
the Owners of the Properties

ATLAS WORKS,

SHEERNESS EAST, KENT

HENRY BUTCHER & CO.

In conjunction with

RULE & RULE

are instructed to OFFER FOR SALE BY
AUCTION, at ATLAS WORKS, SHEERNESS
EAST, on

WEDNESDAY, 3rd DECEMBER, 1958

at 11.15 a.m.,

LOTS 1 AND 2 the

MODERN FREEHOLD PROPERTIES
of SINGLE STOREY STEEL FRAMED,
BRICK AND ASBESTOS CONSTRUCTION
including

WELDING SHOPS, SHOT BLASTING,
ENGINEERING AND PAINT STORES

together with a
**MODERN DETACHED BRICK AND TILED
OFFICE BLOCK**

FLOOR SPACE about 7,408 sq. ft.

SITE AREA approx. 1.75 ACRES

VACANT POSSESSION UPON COMPLETION
To be followed by the Sale in Lots in Detail
of the

PLANT, MACHINERY AND STORES
including

SCHULER 6FT. POWER GUILLOTINE
EDWARDS 6FT. FOLDING MACHINE

S.S. & S.C. AND CAPSTAN LATHES
DRILLING, GRINDING, MILLING AND
SHAPING MACHINES

"T.M.A." ENGRAVING MACHINES
Hand Folders and Guillotines Power Hacksaws

Electric Hand Tools Engineers' Small Tools
Test Equipment

AIR COMPRESSORS, INFRA-RED OVENS
Storage Racks and Bins Benches

Weighing Machines
**ALUMINIUM, S.S., BRASS AND STEEL
SHEETS AND BAR**

SHOT BLAST PLANTS ARC WELDERS
AUSTIN LORRY AND VAN

OFFICE FURNITURE AND EQUIPMENT
Combined Particulars and Conditions of Sale
of the Property and Catalogue of the Plant,
Machinery and Equipment (price 6d. each)
may be obtained of:—

Messrs. Poppleton & Appleby, Accountants
and Auditors, 4 Charterhouse Square, London,
E.C.1; of

Messrs. W. Rowland Waller & Co., Chartered
Accountants, 37 Broadway, Sheerness, Kent; of

Messrs. Winch, Greensted & Winch, Solicitors,
6 Park Road, Sittingbourne, Kent; of

Messrs. Rule & Rule, Surveyors and Auctioneers,
37/39 Broadway, Sheerness, Kent
(Sheerness 2604); and of

Messrs. Henry Butcher & Co., Auctioneers,
Valuers and Surveyors, 73 Chancery Lane,
London, W.C.2. Holborn 8411 (8 lines).

If you do not wish your reply to any Box No.
advertisement in this section to be forwarded to
certain firms, please advise us. Your reply will
then be destroyed, but you will not be notified as
this would disclose the identity of the advertiser.

Estimating Engineer—Appren-
ticeship served and H.N.C. Mechanical,
to join small team in the Technical Office of an
old-established firm of Non-Ferrous Founders
with a well-equipped modern machine shop.
Must be able to make quick and accurate
assessments of weights and machining require-
ments from drawings and have working know-
ledge of Foundry processes.—Send full particu-
lars in confidence, together with present salary
to PERSONNEL OFFICER, THE ANTI-
ATTRITION METAL CO., LTD., Woodlands
Park Works, Maidenhead, Berks.

Production Engineer Required
for well-established Mid-Herts Company
making specialised products. Responsibilities
to include Production Planning and Control
ensuring tool and plant maintenance. Work
study.

This is an excellent position for a practical
man with drive and initiative with sense of
responsibility for which suitable remuneration
will be paid. Willing to wait for the right
person.

Final selection will be made towards the end
of the year.—Give full details of past career
and salary required in own handwriting to
BOX Z688, MACHINERY, Clifton House, Euston
Road, N.W.1.

D.S.I.R. Require Assistant

Experimental Officer at Hydraulics
Research Station, Wallingford, Berks, Engi-
neering Services Section, which is responsible
for purchases of materials and equipment,
control of workshops, stores, transport and site
services. Candidates should have an engi-
neering training and workshop experience.
Qualifications: G.C.E. "A" level in two Science
or Maths, subjects or equivalent. Over age 22.
H.N.C. pass degree, or equivalent generally
expected. Salary range: £370 (age 18)–£645 (26)–
£800. Five day week.—Forms from M.L. & N.S.
TECHNICAL AND SCIENTIFIC REGISTER,
26, King Street, London, S.W.1, quoting
C718/5A. Closing date 28th November, 1958

Interesting Overseas Oppor-
tunity offered to first class toolmaker
experienced in pressure die moulds and press
tools. Two year contract with reputable
Indian Company in Calcutta.—Write full
details BOX Z692, MACHINERY, Clifton House,
Euston Road, N.W.1.

SITUATIONS VACANT

JIG AND TOOL DRAUGHTSMAN
(experienced) required for a wide
variety of interesting work. Generous
pension scheme and comprehensive
amenities. Excellent conditions of
employment. Apply, giving details of
experience, etc., to The Personnel
Manager, W. H. Allen Sons & Co.,
Ltd., Queens Engineering Works,
Bedford.

Production Engineer With Prac-
tical, technical and commercial experience
required by North London Engineering Com-
pany.—Reply giving full particulars to BOX
Z706, MACHINERY, Clifton House, Euston Road,
N.W.1.

An Organization in the East

Midlands has a vacancy for an Engineer
with specialist experience of cutting tool
development and investigations into machining
problems. The successful applicant will be
responsible for practical tests and studies of
production difficulties. Commencing salary
not less than £850 p.a.—Please send details of
career and qualifications to BOX Z711,
MACHINERY, Clifton House, Euston Road,
N.W.1.

Chief Draughtsman Required,

to take charge of small Drawing Office
within 50 miles of London, engaged on Machine
Tool work. To be responsible to Chief Designer.
Must be good disciplinarian and able to work
on own initiative. Salary by agreement, and
according to experience. Pension scheme.
Own staff informed.—Replies in first instance
to BOX Z716, MACHINERY, Clifton House,
Euston Road, N.W.1.

Chargehand Setter for Small

works in Putney. Drills, capstans,
centres, mills and shaper. Excellent prospects
of promotion to man able to prove his worth.—
Write JOHN W. HENDRY, CAREERS
CONSULTANTS, LTD., 29, Cork Street, W.1.

Experienced Draughtsman

required by South London Motor and
Geared Motor Manufacturers.—Reply BOX
Z696, MACHINERY, Clifton House, Euston Road,
N.W.1.

When answering advertisements kindly mention MACHINERY.

Classified Advertisements (SITUATIONS VACANT, contd.)

SITUATIONS WANTED

Highly Paid, Secure and Interest-

ing posts are always available for technically trained men. Find out how you can put some letters after your name by preparing at home on "No Pass—No Fee" terms for A.M.I.Mech.E., A.M.I.Prod.E., A.M.S.E., City and Guilds, etc., etc. Full details of exams and hundreds of courses in all branches of Engineering, Draughtsmanship, Management and Automation Techniques, the benefits of our Employment Dept., and unique record of 95 per cent. successes are given in "Engineering Opportunities"—a valuable 148-page Guide which will reveal many chances you are now missing.—Write for your copy today (stating subject of interest)—FREE and without obligation, B.I.E.T., (Dept. 34a), 29, Wright's Lane, London, W.8.

Draughtsman (Senior and Tool)

experienced in the design of press tools for the mass production of precision stampings and press parts. Knowledge of progression tools and their application to Dieing Presses an advantage. High salary is offered to draughtsman with this specialised experience.—Apply in writing, giving details of experience and salary required to D.G.M., M.K. ELECTRIC, LTD., Wakefield Street, Edmonton, N.18.

Works Superintendent for Progressive Trade Toolmaking Company required.

Applicant must have Trade Shop experience and be used to high class manufacture of jigs, Press Tools, Moulds and Die Casting Dies.

Only persons with first class technical and practical experience should apply, as the position is an important one carrying a high salary and other amenities, including a non-contributory pension scheme.

Apply with full particulars to THE MANAGING DIRECTOR, BRISTOL TOOL & GAUGE CO., LTD., Church Road, Kingswood, Bristol.

Assistant to Chief Engineer.

Young Engineering Graduate required with electrical design experience, knowledge of high production and tooling essential. The post offers considerable scope with a well-established medium-sized Company of electro-magnetic specialists.—Reply fully, stating age and salary required to: PERSONNEL MANAGER, BOX Z717, MACHINERY, Clifton House, Euston Road, N.W.1.

REPRESENTATIVES

Freelance Agents Required for

the sale of well-introduced machine tools and workshop equipment, in all areas except Birmingham and Yorkshire. Liberal commission and mileage allowance. Workshop experience required, car owner preferred.—BOX Z445, MACHINERY, Clifton House, Euston Road, N.W.1.

Freelance Technical Sales Engineers

required in Lancs., Yorks., Midlands and Southern England for established high precision machine tools and equipment. Applicants to have sound practical knowledge and experience in negotiating sales. Car owner essential. Interview required but full details in confidence first instance.—BOX Z668, MACHINERY, Clifton House, Euston Road, N.W.1.

Free Lance Representative Re-

quired for Lancashire, Cheshire and North Staffordshire on generous commission basis by well-known machine tool company.—Will applicants with technical experience and established connections write in confidence to BOX Z690, MACHINERY, Clifton House, Euston Road, N.W.1.

Representative for N. London

required by old-established Merchants to sell Engineers Tools, Workshop Equipment, etc., to large users. Only experienced Salesmen should apply. Salary, commission and expenses, Superannuation scheme. Car provided.—Send full particulars in confidence to BOX Z718, MACHINERY, Clifton House, Euston Road, N.W.1.

Representative Required by

London Company marketing specialised Machine Tools. Generous remuneration and good prospects for experienced man with enthusiasm and appropriate connections, car provided.—BOX Z70, MACHINERY, Clifton House, Euston Road, N.W.1.

Experienced Production Engi-

neer (43), managerial grade shortly available. Accustomed to full responsibility, tool design, methods, purchasing, etc. First class references. Minimum salary £1,200 with prospects. London area.—BOX Z647, MACHINERY, Clifton House, Euston Road, N.W.1.

Engineer Machine or General

Foreman, 20 years executive, 15 years practical experience. Conversant planning, estimating, tooling, buying. Good references. Any position considered. Moderate salary. Tel. Chiswick 7570.—BOX Z689, MACHINERY, Clifton House, Euston Road, N.W.1.

Production Superintendent, 45,

desires change. Wide practical experience Jig and Tool Design, Methods, Planning, Production and Labour Control.—BOX Z699, MACHINERY, Clifton House, Euston Road, N.W.1.

Young Engineer, Age 26, Jig

and Tool App., H.N.C. and B.Sc. (Mech. Eng.), 2 years Prod. Development, moving to London area, requires progressive post with light engineering firm.—BOX Z707, MACHINERY, Clifton House, Euston Road, N.W.1.

Works Manager, 50, Seeks

position, experienced all aspects of light engineering, including toolroom, tool design, planning, purchase, sales and estimating. Post must be progressive.—BOX Z708, MACHINERY, Clifton House, Euston Road, N.W.1.

Production Engineer Who Has

outgrown his present managerial position and specialises in light engineering, wants to get his teeth into something. Would under-study Works Manager if early retirement is envisaged. Not interested in a routine job. Plenty of that rare quality called initiative to tackle the unusual problem. London area.—BOX Z644, MACHINERY, Clifton House, Euston Road, N.W.1.

Works Manager. A.M.Inst.B.E..

Tool room apprentice trained with long Production experience including Planning and Estimating, not opposed to a foreman's position where results will be rewarded. Croydon or South Surrey area.—BOX Z675, MACHINERY, Clifton House, Euston Road, N.W.1.

Chief Inspector Seeks Appoint-

ment in London area. A.I.D., A.R.R., I.E.M.E. Approved.—BOX Z709, MACHINERY, Clifton House, Euston Road, N.W.1.

Engineering Design Consultant,

A.M.I.Prod.E., 7 years in own practice; wishes to disengage with business worries in order to concentrate fully on technical matters. Age 37. Resident N. Middlesex. Salary required £1,300.—BOX Z712, MACHINERY, Clifton House, Euston Road, N.W.1.

M.I.Prod.E., 20 Years Experience

executive management and modern planning from design to despatch including production control to budget. All latest processes including pressure diecasting, shell moulding, etc., in medium light and precision engineering by batch, line and mass production techniques. Linguist, age 52, medically A1. Now free.—311, BIRMINGHAM ROAD, SUTTON COLDFIELD.

Production and Mechanical

Engineer experienced in design, special purpose machines, modification or redesign of machine tools, automotive design and production, gas turbines, heavy engineering, etc.—BOX Z722, MACHINERY, Clifton House, Euston Road, N.W.1.

REPRESENTATIVES

Free Lance Agencies Required

in the South West area, for small machine tools and allied products, e.g. Files, Spanners, Twist Drills, and Gauges, as used in general engineering.—BOX Z698, MACHINERY, Clifton House, Euston Road, N.W.1.

RECEIVED TOO LATE FOR CLASSIFICATION

PLANT WANTED

Wanted, Threading Attachment

for Index O.N.8 Automatic, also Heald Boring Heads.—HICKS MACHINERY, LTD., 26, Addison Place, London, W.11. Tel.: PARK 2333.

Wanted, 10ft. Used Guillotine

to cut 4in. Mild Steel. Urgently required.—Phone: BEDEK Western 8091.

Wanted, Secondhand Wadkin

Heavy Duty Articulated Arm Radial Router, Model L.C.—DEANS & SON (YORKSHIRE), LTD., P.O. Box No. 8, Beverley, Yorks.

Wanted, Secondhand Herbert

Chipstream Roller Boxes for 2D and No. 4 Capcans.—Apply R. T. THORPE, LTD., Brent Way, Brentford.

CONTRACT WORK

Presswork, 25 Tons Maximum,

also Spotwelding capacity available. Tools made, or customers' used materials supplied or accepted.—SILENT (HAXNEL CO.), LTD., Metal Products Division, Huntingdon.

BUSINESS FOR SALE

Precision Engineering Business,

N.W. London (Private Company) for sale as going concern. Well equipped with modern machines, etc. Leasehold factory, low rental. Would consider sale of part capital to engineer willing to become working director.—BOX Z715, MACHINERY, Clifton House, Euston Road, N.W.1.

When answering advertisements kindly mention MACHINERY.

Diprofil

POWER OPERATED



MULTI-PURPOSE MACHINE

featuring
**Diamond and
Tungsten-Carbide
Cutting Tools**

FILING ...
LAPPING ...
SCRAPING ...
GRINDING ...
HONING ...
ENGRAVING ...
MILLING ... SAWING



Highest standard of workmanship ensures consistent accuracy and maximum working life



BROOKS & WALKER LTD.,

47 Great Eastern St., London, E.C.2. SHO 7633

Telex No. 23674

Midlands Office : Swan Lane, Coventry. Tel.: 64246

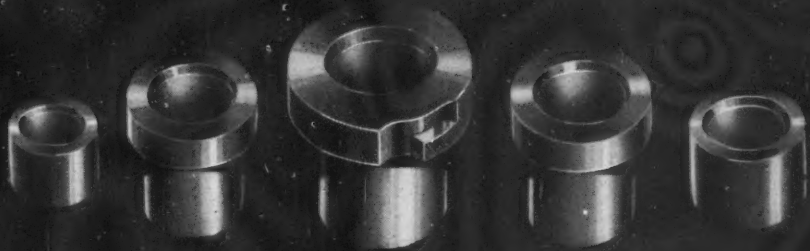
Branches throughout the Country

INDEX TO ADVERTISERS

PAGE		PAGE	
Abbey Heat Treatments Ltd.	162	British Thomson-Houston Co. Ltd., The	79
Abbey Tool Co. Ltd., The	159	Broadbent, Henry Ltd.	55
A.B.M.T.M. Ltd.	17 & 70	Brooks & Walker Ltd.	187
Abwood Machine Tools Ltd., The	13	Broughton, J. & Sons (Engineers) Ltd.	134
Achars Ltd.	184	Brown, David Corporation (Sales) Ltd., The	87
Adam Black & Cement Ltd.	115	B.S. & Tole Ltd.	82
Adcock & Shipley Ltd.	115	BTR Industries Ltd.	121
Alexander, Geo. H. Machinery Ltd.	168	Buck & Hickman Ltd.	68
All Precision Eng'g. Ltd.	72	Buckingham, G. M. Ltd.	176
Aluminium, Brass & Diecasting Foundry Ltd.	154	Burned, F. & Co. Ltd.	71
Amar Tool & Gauge Co. Ltd.	91	Burton, Griffiths & Co. Ltd.	171
Ambrassy Eng'g. Co. Ltd.	193	Butcher, Henry & Co.	185
Anderson Springs Ltd.	158		
Anus, George & Co. Ltd.	62		
Archdale, James & Co. Ltd.	60		
Armstrong Siddle & Co. Ltd.	53		
Armstrong Tools Ltd.	53		
Ashton, N. C. Ltd.	148		
Asquith, Wm. Ltd.	<i>Inside Front Cover</i>		
Atkin, W. T. (Tottenham) Ltd.	123		
Automotive Eng'g. Ltd.	164		
Auto productions Ltd.	164		
Aylesbury Turned Parts (True Screws) Ltd.	164		
Baker, W. A. & Co. Ltd.	129		
Bell, H. (Machine Tools) Ltd	172, 181 & 185		
Benson Verniers	138		
Benton Eng'g. Co. Ltd.	163		
B.G. Machinery Ltd.	141		
Biggs & Berry Bros. (Hull) Ltd.	52		
Birfield Tools Ltd.	143		
Birmingham Tool & Gauge Co. Ltd.	84		
Blaker Motor & Welding Co. Ltd., The	162		
Bloxis & Eng'g. Co. Ltd.	148		
Bradley & Turton Ltd.	148		
Brasshouse, Peter Ltd.	188		
Brillhart Ltd.	169		
British Aero Components Ltd. <i>Inside Back Cover</i>	103		
British Celanese Ltd.	103		
British Die Casting & Eng'g. Co. Ltd.	20		
British Laminated Brass Co. Ltd.	144		
British Northrop Ltd.	131		
		Candentools	167
		Candler, R. E. Ltd.	166
		Carron Co.	153
		Carter, B. & F. & Co. Ltd.	169
		Cassell Tool Works	152 & 182
		Centaur Tool Works	152 & 182
		Cenotec Machine Tools Ltd.	151
		Chater-Lea Mfg. Co. Ltd.	165
		Churchill, Chas. & Co. Ltd.	63
		Churchill Machine Tool Co. Ltd., The	70
		Cincinnati Milling Machines Ltd.	70
		Clarkson (Engineers) Ltd.	61, 76 & 77
		Cohen, Geo. Sons & Co. Ltd.	23 & 179
		Cooke, Troughton & Simms Ltd.	122
		Cornell & Buckle Ltd.	136
		Corncroft Ltd.	114
		Coventry Gauge & Tool Co. Ltd.	5
		Coventry Grinders Ltd.	166
		Craven, B. (Manchester) Ltd.	34
		Cread, A. B. Ltd.	142
		Cross Manufacturing Co. (1938) Ltd.	152
		Crowthorn Eng'g. Co. Ltd.	2
		Davall Gear Co. Ltd., The	161
		Davies Stuart (U.K.) Ltd.	162
		Davis, Stuart Ltd.	99
		Debnordis Eng'g. Co. Ltd.	159
		Deslucx (Coventry) Ltd.	159
		Desoutter Bros. Ltd.	106
		Die Cast Products (London) Ltd.	110
		Die Casting Machine Tools Ltd.	10
		Dimco (Gt. Britain) Ltd.	174
		Dinsdale Eng'g. Co. Ltd.	190
		Donovan Electrical Co. Ltd., The	169
		Dorner & Wadsworth Ltd.	167
		Dowling & Doll Ltd.	37, 38, 39, 128 & 158
		Drummond-Asquith (Sales) Ltd.	124
		<i>Inside Front Cover & 57</i>	
		Dunbar & Cook Ltd.	124
		Dunchrome, F. B. H. Ltd.	4
		Eclipse Steel Industries Ltd.	165
		Economic Milling Ltd.	166
		Edmonton Tool & Eng'g. Co. Ltd.	167
		Edwards Bros.	165

(Continued on page 188)

When answering advertisements kindly mention MACHINERY.

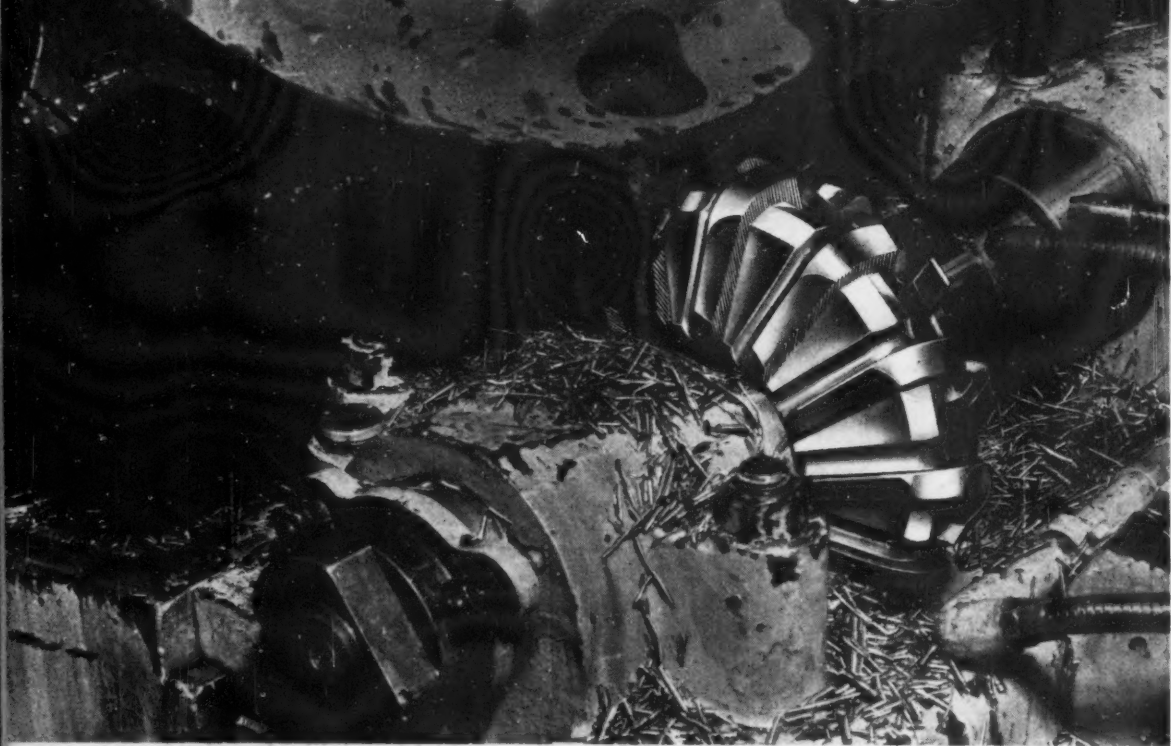


Nitrided

come quickest!
last longest!!
cost least to use!!!

|

CUTTING SPROCKET TEETH—AT ONE PASS



AT F. H. LLOYD & CO. LTD., WEDNESBURY
Using GALTONA O-K special form interlocking cutters, as shown, F. H. Lloyd & Co. Ltd., Wednesbury, have achieved exceptional rates of output on cast steel sprockets. The pre-cast teeth are finished at one pass. Depth of cut is approximately $\frac{1}{4}$ in., with a speed of 34 r.p.m. and feed of $1\frac{1}{2}$ in. per min. Cutter diameter is $9\frac{1}{2}$ in., with a total overall width for the two cutters of $4\frac{1}{2}$ in. If you need standard or special Cutters, our Tool Engineers will be only too pleased to submit recommendations on receipt of necessary details. Literature available on request.

Richard Lloyd Limited

GALTON HOUSE, ELMFIELD AVENUE, TYBURN, BIRMINGHAM, 24

Telephone: Ashfield 1801, Telegrams "Cogs, Birmingham"

NORTHERN AREA OFFICE: A. V. Green, Britannia House, Wellington St., Leeds, 1. Tel. Leeds 21212 • LONDON AREA OFFICE: A. I. Percy, 240 Romford Rd., Forest Gate, London, E.7. Tel. MARYland 7304/5 • NORTHERN IRELAND: Garage & Engineering Supplies Ltd., 78, Great Victoria St., Belfast • SCOTLAND: Stuart & Houston, 5 York St., Glasgow, C.2.